ITD Workspace Development, Training and Custom Courseware Development Project

CADD Standards Summary Report

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Introduction

In an effort to unify the appearance of drawings that are included in plan sets, enhance collaboration on design projects, improve the ability to share CADD data with consultants and subcontractors, and increase the overall efficiency of CADD users, the Idaho Transportation Department (ITD) will be implementing new English unit CADD and design standards. Professional Software Solutions, Inc. (ProSoft) has been employed to assist with standards development and the implementation of software that will facilitate standards compliance. This will be accomplished through a multi-phased project during which CADD and design standards will be developed, CADD and design resources will be created, and NetSPEX™ will be implemented to deliver CADD standards-compliant drawing components to users both inside and outside of the Idaho Transportation Department. Additional tools will be developed to assist with the creation of new projects, and the delivery of CADD standards-compliant resources and NetSPEX drawing components to consultants and subcontractors. In addition, the ITD AutoPayItem application will be updated and enhanced for use with English units.

During the project, ProSoft will also create courseware for custom training courses, which will include instruction to help users migrate to InRoads 8.2®, become familiar with the new ITD CADD and design standards, and learn proper techniques for using NetSPEX to produce CADD drawings. This project is expected to continue for several months and will culminate in the deployment of new CADD and design standards throughout the Idaho Transportation Department.

The purpose of this document is to summarize all CADD standards development subtasks for Project Task 1. A similar document will be prepared to summarize design standards development subtasks for Project Task 2. On the pages that follow, each Task 1 subtask is described with the problem identification (if applicable) and any proposed recommendations. The information contained in this document will be used as the foundation for the development of CADD resources and the NetSPEX CADD standards database.

Project Tasks

Following are descriptions, findings, and recommendations for the CADD standards development tasks. Since this information will be used as the foundation for the CADD resource and NetSPEX database development, which will commence soon after the standards are approved, this document should be reviewed carefully to verify and confirm acceptance of the proposed standards.

1.1 Project Initiation Meeting

A project initiation meeting was held on December 16-18, 2002 at the Idaho Transportation Department headquarters in Boise. The general purpose of this meeting was to conduct a standards and system review in preparation for the development of CADD and design standards.

Prior to this meeting, significant effort had already been expended by ITD personnel to define drawing types and level structures for the new CADD and design standards. These drawing types were reviewed and discussed during the project initiation meeting. Preliminary discussions about proposed naming conventions for CADD and design resources and NetSPEX deployment options and requirements were also held.

1.2 Project Initiation Meeting Notes

The notes from the Project Initiation Meeting were compiled and submitted to ITD for review in late December 2002. ITD returned the document with comments and additional clarification.

1.3 Project Time Line and Task List

After the Project Initiation Meeting, ProSoft submitted a task list and preliminary project time line, which estimated a late June 2003 project completion date. However, due to additional time requirements needed to develop the CADD and design standards and complete the MicroStation and InRoads resources, the project time line has been extended. ProSoft estimates that the project will be completed by the first week of November 2003.

1.4 Meeting Summary Notes with ITD Comments

After receiving the meeting notes with ITD comments, ProSoft conducted an internal review of these notes. A meeting was held on January 9-10, 2003, with ProSoft team members to review the notes and findings, review the time line and project tasks, and develop a strategy for completion of those tasks.

1.5 Existing Standards, Conventions, and Sample Drawings

Some existing guidelines for the appearance of drawings are outlined in the ITD Design Manual and other related documents that are available either from the ITD Publications CD ROM, or for download from the ITD Web site. In addition to these documents, ITD has developed some sample drawings that contain examples and instructions pertaining to the placement and appearance of annotation and graphics. While most of this information was developed for the current Metric unit standard, some remnants of the English unit standard, which was used prior to the Department's migration to Metric units, are available in the form of documents and sample drawings. ProSoft has conducted a review of these documents and sample drawings.

1.6.1 Standard Project Directory Structure

To this point, ITD has not implemented a standard project directory structure. A few districts have attempted to adopt their own project directory structures. However, reviews of some sample project directory structures from several of the district offices revealed inconsistencies in the way the data has been stored, even within the districts. While there were in some instances similarities in the way project data was structured, none of the project directory structures were exactly alike.

In order for a workspace configuration to work effectively, project-specific CADD resources and design files must be well organized and stored logically within a standard directory structure. However, due to inconsistencies in the way project data is currently organized, it would be very difficult for those who are working on existing projects to realize the benefit of a workspace configuration. For this reason, the workspace will be designed primarily for use with projects that will be based on the new English unit CADD standards. CADD users will, however, still have the option to launch MicroStation outside of the confines of the workspace to allow for the completion of legacy project work.

A preliminary project directory structure was discussed at the Project Initiation Meeting that was held in December 2002. However, several subsequent revisions have been made to this structure as further examination of the project data requirements was completed and as additional input was received from ITD personnel. The most recent changes were made during the standards review meeting held on March 4-6, 2003. These changes exemplify what both ITD and ProSoft believe is a completed project directory structure.

A convention was also developed for folder names. It was determined during standards review meetings and in subsequent communications that most users would appreciate and more readily adapt to folder names that were more explicit and descriptive. For this reason, full names, rather than abbreviated names or codes, are used throughout the project directory structure. In accordance with ITD conventions, spaces in names have been replaced with underscores.

The approved project folder structure is represented in the table below.

Projects	Root directory for all projects
Prj#####	Project data folder
Concept	Contains subfolders with Concept files and documentation
Correspondence	Concept correspondence
Exhibits	Concept exhibits
Photographs	Concept photographs
Construction	Contains subfolders with Construction files and documentation
As_Builts	As-Built model files and related resources
Correspondence	Construction correspondence
Details	Construction details
Documentation	Construction documentation
Photographs	Construction photographs
Environmental	Environmental development model files
Correspondence	Environmental correspondence (i.e., general letters, submittal letters)
Corridor_Assessment	General and technical information for the corridor or roadway assessment, such as traffic analysis reports
Documentation	Environmental documentation
Exhibits	Vicinity sketches, typical sections, plan sheets, finished photos, detail exhibits, etc.
Photographs	Environmental photographs
Maintenance	Contains folders with Maintenance files and documentation
Correspondence	Maintenance correspondence
Documentation	Maintenance documentation
Photographs	Maintenance photographs
Project_Development	Contains Project Development-related folders, files and documentation
Bridge	Bridge model design files
Analysis	Bridge technical design documentation
Correspondence	Bridge correspondence (i.e., general letters, submittal letters)
Photographs	Bridge project site photographs
Quantities	Bridge quantity calculations and documentation
Specifications	Bridge structure-related special provisions
Civil_Data	Civil data files (i.e., InRoads, other)
Existing	Existing data collected from field, aerial, or satellite surveys, scanned drawings, existing utilities, right of way, signaling information, etc.
Hydraulics	Hydraulics model files
Correspondence	Hydraulics correspondence
Documentation	Hydrographic and hydraulics calculations and documentation
Photographs	Hydraulics site photographs
Landscape	Landscape model design files
Correspondence	Landscape correspondence
Documentation	Landscape documentation
Photographs	Landscape site photographs
Location	Information copied from the Location section
Correspondence	Location correspondence files (i.e., general letters, submittal letters)
Documentation	Location documentation
Materials	Materials model design files
Correspondence	Materials correspondence (i.e., general letters, submittal letters)
Phase_I_Rpt	Materials Phase I Report files, documentation, photographs
Phase_II_Rpt	Materials Phase II Report files, documentation, photographs

Phase_III_Rpt	Materials Phase III Report files, documentation, photographs
Phase_IV_Rpt	Materials Phase IV Report files, documentation, photographs
Phase_V_Rpt	Materials Phase V Report files, documentation, photographs
Minor_Structures	Minor Structures model design files
Analysis	Minor Structures technical design documentation
Correspondence	Minor Structures correspondence (i.e., general letters, submittal letters)
Documentation	Minor Structures documentation
Photographs	Minor Structures site photographs
Quantities	Minor Structures quantity calculations and documentation
Specifications	Minor Structures-related special provisions
Plan_Sheets	All project sheet files (construction design drawings)
Project_Resources	Project-specific miscellaneous files (i.e., .DGN, .CIT, etc.)
InRoads	Project-specific InRoads resource files
MicroStation	Project-specific MicroStation resource files
Miscellaneous	Project-specific miscellaneous resource files
Right_of_Way	Right-of-Way model design files
Correspondence	Right-of-Way correspondence (i.e., general letters, submittal letters)
Documentation	Right-of-way documentation
Exhibits	Right-of-Way general information (i.e., photos, plats, record of survey)
Parcels	Right-of-Way parcel files and documents
Photographs	Right-of-Way site photographs
Quantities	Right-of-Way quantity calcs, docs for Payments in Lieu of Construction
Roadway	Roadway model design files
Correspondence	Roadway correspondence
Documentation	Roadway documentation
Photographs	Roadway site photographs
Traffic	Traffic model design files
Correspondence	Traffic correspondence
Documentation	Traffic documentation
Photographs	Traffic site photographs
Utilities	Utility model design files
Correspondence	Utility correspondence
Documentation	Utility documentation
Photographs	Utility site photographs
Project_Management	Contains subfolders with Project Management files and documentation
Correspondence	Project Management correspondence (i.e., general letters, submittal letters)
Documentation	Project Management files and documentation
Professional_Agreement	Project Management consultant agreement documents
Proposals	Project Management proposals and related information
Scheduling	Microsoft Project or other time management software files
Public_Involvement	Public Involvement model files
Correspondence	Public Involvement correspondence
Documentation	Public Involvement documentation
Exhibits	Photos, public meeting exhibits, etc.
Public_Comments	Informal and formal public comments
Visualization	Visualization project files and supporting resources

1.6.2 Standard CADD Resource Directory Structure

To facilitate the use of the workspace configuration, the standard MicroStation and InRoads CADD resources will be stored in an organized directory structure. An initial CADD resources directory structure was developed in December. Several minor revisions to this structure have been made over the last couple of months. The most recent version, which both ITD and ProSoft believe represents the final resource data structure, is shown in the table below.

CADD_Standards	Root directory for CADD resources
API	AutoPayItem application resource folder
Bentley	Bentley CADD Resource folder
Civil_Resources	All resources used by Bentley Civil products
Iplot	All resources used by IPLOT
Settings	IPLOT settings files
Work	IPLOT table files
MicroStation	All resources used by MicroStation
Bridge	
Cell_Libraries	Bridge cell libraries
Data	Bridge data files
Macro	Bridge macros
MDL_Apps	Bridge MDL applications
Resource_Files	Bridge MicroStation resource files
Seed_Files	Bridge seed files
Config	MicroStation configuration files
Appl	Application configuration files
Project	Project-level configuration files
Site	Site-level configuration files
User	User-level configuration files
Construction	
Cell_Libraries	Construction cell libraries
Data	Construction data files
Macro	Construction macros
MDL_Apps	Construction MDL applications
Resource_Files	Construction MicroStation resource files
Seed_Files	Construction seed files
Environmental	
Cell_Libraries	Environmental cell libraries
Data	Environmental data files
Macro	Environmental macros
MDL_Apps	Environmental MDL applications
Resource_Files	Environmental MicroStation resource files
Seed_Files	Environmental seed files
General	
Borders	Standard border files
Cell_Libraries	General cell libraries
Data	General data files

				Interfaces	Interfaces
				Macro	General macros
				MDL_Apps	General MDL applications
				Resource_Files	General MicroStation resource files
				Seed_Files	General seed files
				Tables	Tables
			GIS		
				Cell_Libraries	GIS cell libraries
				Data	GIS data files
				Macro	GIS macros
				MDL_Apps	GIS MDL applications
				Resource_Files	GIS MicroStation resource files
				Seed_Files	GIS seed files
			Hydraulics		
				Cell_Libraries	Hydraulics cell libraries
				Data	Hydraulics data files
				Macro	Hydraulics macros
				MDL_Apps	Hydraulics MDL applications
				Resource_Files	Hydraulics MicroStation resource files
				Seed_Files	Hydraulics seed files
			Landscape		
				Cell_Libraries	Landscape cell libraries
				Data	Landscape data files
				Macro	Landscape macros
				MDL_Apps	Landscape MDL applications
				Resource_Files	Landscape MicroStation resource files
				Seed_Files	Landscape seed files
			Location		
				Cell_Libraries	Location cell libraries
				Data	Location data files
				Macro	Location macros
				MDL_Apps	Location MDL applications
				Resource_Files	Location MicroStation resource files
				Seed_Files	Location seed files
			Maintenance		
				Cell_Libraries	Maintenance cell libraries
				Data	Maintenance data files
				Macro	Maintenance macros
				MDL_Apps	Maintenance MDL applications
				Resource_Files	Maintenance MicroStation resource files
				Seed_Files	Maintenance seed files
			Materials		
				Cell_Libraries	Materials cell libraries
				Data	Materials data files
				Macro	Materials macros
				MDL_Apps	Materials MDL applications
				Resource_Files	Materials MicroStation resource files
				Seed_Files	Materials seed files

Minor_Structures	
Cell_Libraries	Minor Structures cell libraries
Data	Minor Structures data files
Macro	Minor Structures macros
MDL_Apps	Minor Structures MDL applications
Resource_Files	Minor Structures MicroStation resource files
Seed_Files	Minor Structures seed files
Right_of_Way	
Cell_Libraries	Right-of-Way cell libraries
Data	Right-of-Way data files
Macro	Right-of-Way macros
MDL_Apps	Right-of-Way MDL applications
Resource_Files	Right-of-Way MicroStation resource files
Seed_Files	Right-of-Way seed files
Roadway	
Cell_Libraries	Roadway cell libraries
Data	Roadway data files
Macro	Roadway macros
MDL_Apps	Roadway MDL applications
Resource_Files	Roadway MicroStation resource files
Seed_Files	Roadway seed files
Traffic	
Cell_Libraries	Traffic cell libraries
Data	Traffic data files
Macro	Traffic macros
MDL_Apps	Traffic MDL applications
Resource_Files	Traffic MicroStation resource files
Seed_Files	Traffic seed files
Utilities	
Cell_Libraries	Utilities cell libraries
Data	Utilities data files
Macro	Utilities macros
MDL_Apps	Utilities MDL applications
Resource_Files	Utilities MicroStation resource files
Seed_Files	Utilities seed files
Visualization	
Cell_Libraries	Visualization cell libraries
Data	Visualization data files
Macro	Visualization macros
MDL_Apps	Visualization MDL applications
Resource_Files	Visualization MicroStation resource files
Seed_Files	Visualization seed files
Project_Builder	All resources used by the Project Builder application
Prototype	Folder with prototypical project structure(s)
Prjnnn	Prototypical project structure

1.7.1 Drawing Type Spreadsheets

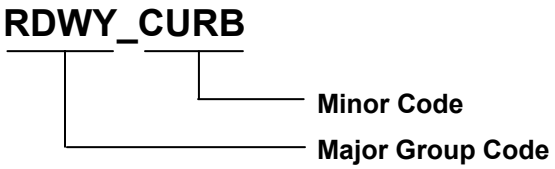
The drawing types and level structures that have been created during this phase of the project will serve as the foundation of the ITD CADD standards. These are necessary components for the implementation of NetSPEX. As mentioned previously, ITD has created spreadsheets with drawing types that have been used as the starting point for the development of the CADD standards. However, several additional revisions have since been made to both the drawing types and their level structures. In general, the number of drawing types has been simplified to make it easier for both internal and external consultant and contractor software users to understand the purpose and intent of the standard. While many drawing types and level structures have been defined, some are not yet complete. See the tables in Appendix A for a list of drawing types and their associated level structures.

1.7.2 Level and Level Group Names

MicroStation/J, the CADD software that is currently employed by the Idaho Transportation Department, does not require the use of level names. For this reason, ITD has not yet adopted a level naming structure and convention. However, to maintain compatibility with consultants who may have already migrated to MicroStation V8, or in the future, with consultants who may be using AutoCAD, the development of level names is a necessary exercise. A standard that uses level names is also better suited to deployment with NetSPEX.

There are a variety of ways to structure a level naming convention. The major considerations when developing a naming convention are the ability of CADD users to interpret the name, the length of the name, and the ease with which it can be implemented effectively in software solution, such as MicroStation or NetSPEX.

After several sessions during which level names were discussed, a convention was developed in which a major code will be used to designate the group with which the level will be associated, and a minor code will be used to describe the contents of the level. An underscore character will separate these two codes. The use of the underscore character will be employed as a common component of the ITD naming conventions to provide separation between parts of a name. An example of this level naming convention is shown below:



Note: While lowercase letters will generally be used in all ITD naming conventions, level names will use uppercase letters.

Since NetSPEX generates level name information directly from the database, the need to include level and level group names in the seed file is eliminated. However, if ITD eventually decides to create level groups in its MicroStation seed files, the group name will match the major group codes in the level structures. For example, if the major group code for a set of levels is RDWY, as shown in the naming example above, the level group name for that set of levels will also be RDWY.

1.7.3 Level Descriptions

Up to this point, ITD has not used formal level descriptions within its CADD or design software. However, level descriptions will be necessary since they are generally used to describe components in the NetSPEX Designer interface. The drawing type spreadsheets already contain much of this information. These spreadsheets will be converted to a format that will be used to import the CADD standard level information into the NetSPEX database. In general, ProSoft's assessment of these descriptions is that they will be adaptable for use as NetSPEX component names.

1.7.4 Properties (Color, Style, Weight)

Where possible, each level has been assigned a single set of color, line style, and weight properties. However, there are some instances where these properties have, by design, been defined with variable settings, or where individual drawing components will have their own set of properties that may deviate from level defaults. This situation can be accounted for in NetSPEX.

The properties for color, style, and weight have been entered in the drawing type spreadsheets. This information will be reviewed prior to import and thoroughly tested for accuracy once the database has been created.

1.7.5 Font Numbers and Sizes for Annotation Levels

All drawing types have been designed with annotation levels. To maintain consistency, levels 50-59 are reserved for the placement and storage of annotation, such as text, callouts, and dimensions.

The drawing type spreadsheets contain columns in which the fonts and text sizes have been specified. This information will be included in the NetSPEX standards database as text styles that the annotation components will reference when placed.

1.7.6 Transition Control Names

The drawing type spreadsheets contain a column with transition control names, where their use is appropriate. The same names will be assigned to the feature codes that are used in survey software. This unique approach will allow consistent naming to be used throughout the entire design process, from survey to modeling.

ProSoft sees no reason to change any of these names, as they appear to be appropriate for their respective applications. Software users should also be accustomed to them since they are derived from existing feature codes.

1.7.7 NetSPEX Component Types for Levels

NetSPEX has the ability to place a variety of component types, including annotation, custom, detail, dimension, linear, multi-line, pattern, and symbol. This information is imported into the standards database through specially formatted spreadsheets. Suggested component types have been included in the drawing type spreadsheets. In some instances, multiple component types will be assigned to a single level.

1.7.8 DNC Application for Levels

When modeling with InRoads, there are some occasions when a certain feature should not be contoured during the surface modeling process. ITD has indicated in the drawing type spreadsheets, which items should be assigned this attribute.

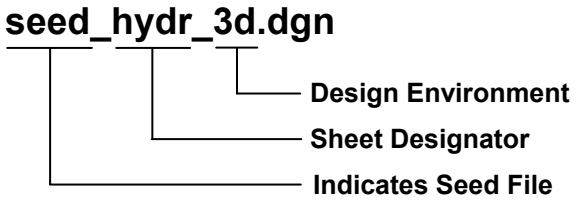
1.7.9 Plan or Profile Display

It will be necessary to display some of the components on levels within the design file in plan, profile, or both. This has been indicated in the drawing type spreadsheets.

1.8.1 Standard Seed File Naming Conventions

ITD has generally used four standard seed files. With the implementation of the new CADD standards and the NetSPEX standards deployment software, however, seed files will be created in both 2D and 3D format for each drawing type. These files will be branded for use with NetSPEX to allow the appropriate drawing-specific CADD resources to be delivered to the user when the file is opened.

Seed files will be named using the “seed” prefix, the sheet designator code for the drawing type, and either “2D” or “3D” to indicate the format of the seed file. These items will be separated by an underscore character in the name, as shown below:



1.8.2 Existing Seed Files

The existing seed files have been set up for use with the current Metric unit standard. A single seed file can encompass the area of the entire state of Idaho with current working unit settings, which have been defined to provide an appropriate compromise between coordinate accuracy and working area. Both English and Metric variations are currently being maintained, although state mandates will require that in October 2003, all future projects will be designed and constructed using English units. Some Metric unit projects are currently active, although these projects have been trailing off over the last couple of years in anticipation of transitioning to projects that are based on English units. Seed files do not currently contain level name and group information or reference file attachments.

1.8.3 Seed File Working Units and Coordinate Readout Settings

The seed files that will be deployed with the new CADD standards will be defined with English units and coordinate readout settings. The table below contains a summary of these settings:

Standard English Unit Seed Files:	Bridge English Unit Seed Files:
Working Units: **FT:100:10** Coordinates: Format: Master Units Accuracy: 0.1234 Angles: Format: DD MM SS Mode: Conventional Accuracy: 0	Working Units: **':":12:1600** Coordinates: Format: Sub Units Accuracy: 1/16" Angles: Format: DD MM SS Mode: Conventional Accuracy: 0

1.8.4 Global Origin Settings

As mentioned previously, both 2D and 3D seed files will be maintained for each drawing type. The global origin settings will be defined for these design environments as follows:

English Unit 2D Seed Files:	English Unit 3D Seed Files:
Global Origin: **0,0** (Positioned at the lower left corner of the design plane)	Global Origin: **0,0,-2147483.648** (Positioned at the lower left corner of the design cube)

1.9.1 Standard Project Folder Naming Conventions

ITD has already standardized on a project naming convention. This convention uses the "prj" prefix, followed by the project number, as shown below:

prj00556

ProSoft recommends that this convention be maintained, particularly since the use of a project number is generally considered standard industry practice. To this point, most projects have used a four-digit project number. However, the number of completed or active projects will soon exceed 10,000, which will necessitate a change to a five-digit project number.

1.9.2 Project Creation Workflows

Chapter 2 in the ITD Design Manual outlines the procedure for submitting project initiation requests and acquiring approval for project funding. Once approval to begin work has been granted, the district project manager is usually the person who ensures that the folder structure and appropriate project data are created. There is currently not, however, an approved Department-wide procedure for setting up the structure and CADD resource data that will be associated with the project. Project design and data files have been created and stored in a variety of non-standard subdirectory structures, which has presented problems with work sharing and archiving. This is one of the most serious workflow problems that ITD is currently facing and one of the primary reasons for the development of the CADD standards. ProSoft's review of some sample project directory structures revealed that no two of these structures are alike in terms of the storage folders that are used, and the design files and supporting documents, spreadsheets, ASCII files, and reports that are contained therein.

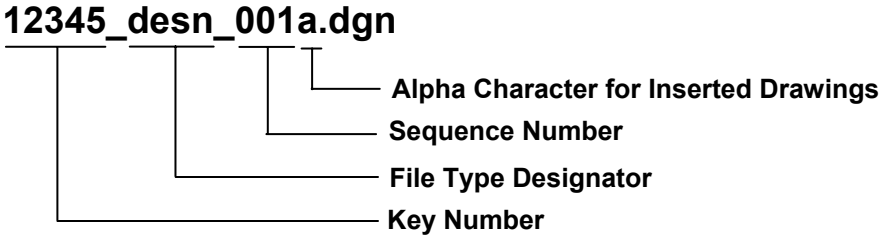
There is clearly a need to standardize the way projects are created and maintained throughout the project life cycle. This is especially true when a workspace configuration is implemented. One significant key to data storage uniformity is to ensure that project data is generated in the same manner at the start of each project. To help make this possible, ProSoft will design and create a Project Builder application that is customized specifically to ITD project requirements. The scope of this application has been determined with consultation and input from the ITD CADD support team. The primary function of the application will be to create a uniform project structure that is named with the assigned project key number, and populated with project-specific MicroStation and InRoads CADD resources.

1.10.1 Standard Design File Naming Conventions

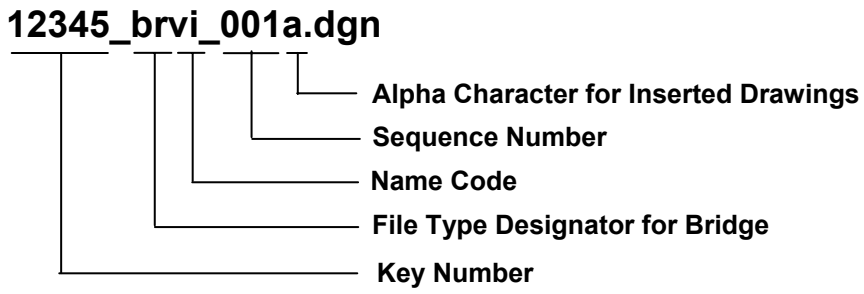
Prior to an explanation of model design file naming conventions, it is important to establish definitions for the four primary design file types that will be adopted with the new CADD standards. These definitions are summarized in the table below.

Design File Type	Definition
Border File	Border files are MicroStation design files that contain a border template and annotation that is common to all pages within the plan set. The common annotation includes the project key number, project name, county, and district identifier. This common border file is referenced to sheet files. Border files will be stored with a .BDR file extension to distinguish them from other design files. The Project Builder application will be used to copy border files into the project directory structure.
Model File	Model files are MicroStation design files that contain elements representing current or future conditions in the project area. These files are referenced to sheet files. Models could be referenced to a single sheet file multiple times, or could be referenced to multiple sheet files. Model files are stored with the standard MicroStation .DGN file extension.
Sheet File	Sheet files are MicroStation design files that contain annotation and elements that are specific to one page in the plan set. Model files and border files are referenced to the sheet file to create plot-ready drawings. Sheet files are stored with the .SHT file extension.
Standard Drawing	Standard drawings are design files that contain completed design standards that are used repetitively in plan sets. They contain their own special border sheets. These drawings are inserted, without modification, directly into the plan sets. Standard drawings are stored with the .STD file extension.

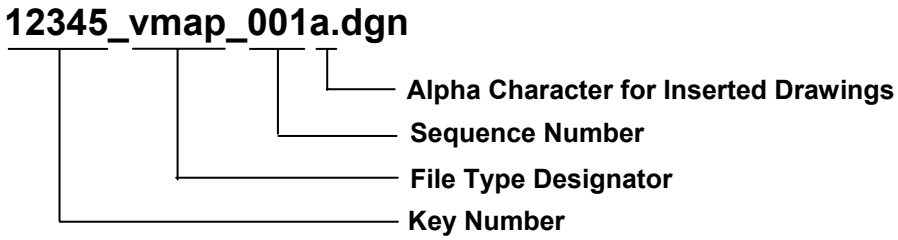
The naming conventions that are presented below are intended for ***model*** design files. Names will include a project key number prefix, a file type designator code, three-digit sequence number, and alpha character for design files that are inserted into the sheet sequence at a later time. The three primary components of the name will be separated by underscores when the design file is created, as shown in the example below:



For Bridge model design files, the “br” drawing type designation code will be used to indicate that the file contains bridge structure information, followed by a code for the street, river, or other feature for which the bridge is being generated, as illustrated in the example below:



Map model design files will follow the same general convention as used for other model drawing types. Names will include a project key number prefix, file type designator code, and three-digit sequence number. These three components will be separated by underscores in the file name, as shown in the example below:



1.10.2 Design File Types

Many distinct model design file types were identified during the initial standards review process that was started in December of 2002. One factor that contributed to the initial proliferation of these file types was the fact that many unique variations of border files were being maintained, along with proposed and existing versions of the Utility, Right-of-Way, Traffic Control, Illumination, and Signal Plan design file types. During the standards development progress meeting that was held on March 4-6, 2003, many of these proposed file type definitions were consolidated to reduce the number of unique file types.

With this more simplified file type list, ITD CADD users will have fewer file types with which they will have to become familiar. Also, the intent and purpose of the model file types will be easier for subcontractors and consultants to interpret when working on ITD projects. In addition, the development and maintenance of CADD resources and NetSPEX drawing components will be simplified, which will help reduce the system administration overhead.

The table below includes the approved model design file types. The discipline that has ownership of the file and a sheet designator code that will be used in the file name is also shown.

Model Design File Types	Discipline	Sheet Designator Code
Border	General	BORD
Design	Roadway	DESN
Details and Diagrams	General	DETL
Foundation Investigation	Materials	FINV
Hydraulics	Hydraulics	HYDR
Illumination	Traffic	ILLM
Landscape	Roadway	LAND
Minor Structures	Roadway	MSTR
Profile	Roadway	PROF
Record of Survey	Right-of-Way	RSRV
Right-of-Way	Right-of-Way	ROW
Signals	Traffic	SGNL
Signing and Pavement Marking	Traffic	SIGN
Soils Profile	Materials	SOIL
Source Plat	Materials	PLAT
Source Reclamation Plan	Materials	RECL
Special Map	General	SMAP
State Maintenance Group	Maintenance	SMGR
Structures	Bridge	BR__*
Topography	Survey	TOPO
Total Ownership Map	Roadway	OMAP
Typicals	Roadway	TYPI
Utilities	Roadway	UTIL
Vicinity Map	General	VMAP
Workzone Traffic Control	Traffic	TRAF
X-Section	Roadway	XSEC

**The spaces in the Structures drawing type name indicate where a two-character code will be inserted to denote the location of the bridge in the roadway project.*

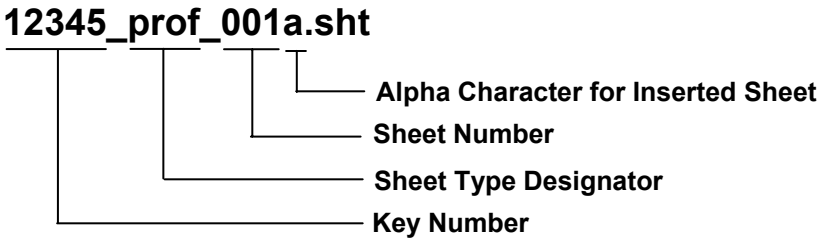
1.10.3 Design File Creation Workflow

Currently, design files are created using one of the four approved ITD seed files. However, in some cases, existing project design files that already contain design data are being copied and used as templates for new files. The practice of creating design files using seed files will not change when the new CADD standards and standards enforcement tools are introduced. However, one major difference will be the fact that each drawing type will now have its own seed file. These seed files will be maintained in both 2D and 3D format. The selection of a specific seed file for each drawing type will establish the NetSPEX branding to allow for the intelligent loading of drawing-specific design resources. During the training course, emphasis will be placed on the importance of creating design files using this workflow.

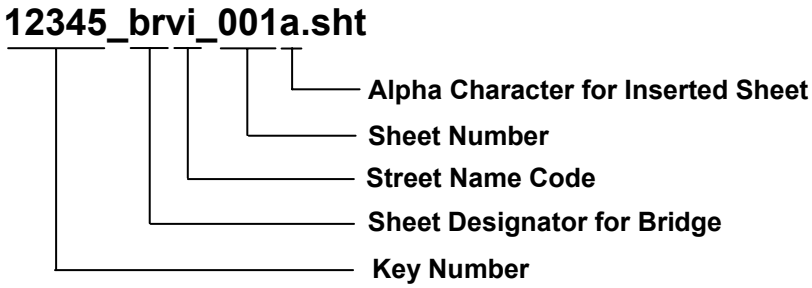
The Project Builder application will facilitate the creation of new project folders and files. The extent to which ITD wishes to automate the creation of such project data could have some effect on the design file creation workflow since many prototype model files could be created by this application at the start of a project.

1.11.1 Sheet File Naming Conventions

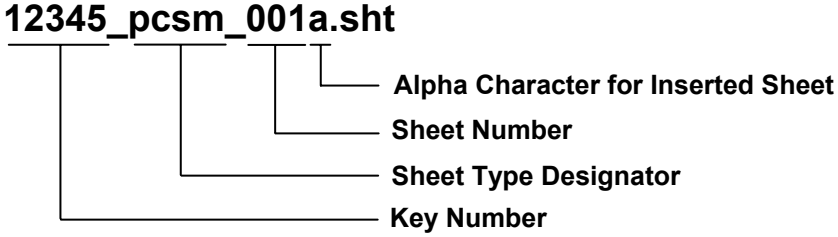
Sheet file naming will follow the same general convention as model files. Names will include the five-digit project key number, sheet type designator code, three-digit sheet number, and an alpha character, which will only be used if the sheet is being inserted into an existing plan set. The .SHT file extension will be used to distinguish sheet design files from model design files. The main components of the name will be separated by underscores, as shown in the example below:



While the format for Bridge sheet file names will be similar to other disciplines, the unique requirements of this section justify some slight sheet file naming differences. Bridge sheet file names will include the five-digit project key number, the two-letter "br" sheet type designator code to indicate that it is a sheet file containing bridge structure information, a two-letter structure location code, which is intended to be an abbreviation for the street name, river, other feature for which the structure is being created, a three-digit sheet number, and an alpha character, which will only be used if the sheet is being inserted into an plan set between two existing sheet files, as illustrated in the example below:



Summary sheets will follow the same general convention used for other drawing types. Names will include a project key number prefix, sheet type designator code, a three-digit sheet number, and an alpha character, which will only used if the sheet is being inserted into an existing plan set. The major components of the file name will be separated by underscores, as shown in the example below:



1.11.2 Sheet File Types

During the standards review process, and once definitions of the various types of design files to be used in the new CADD standards was clearly defined, ITD and ProSoft agreed that there should be relatively few unique sheet types. Since minimal information is stored in sheet files, many of them, regardless of design discipline, should share the same general level structure. Therefore, the sheet drawing types, or those files that by definition contain annotation and elements that are specific to one page in the plan set, were consolidated into one of the six general categories that are listed in the table below:

Sheet File Types
Detail Sheets
Diagrams and Schedules
Note Sheets
Plan Sheets
Summary Sheets
Title Sheets

A seed file will be created for each of the sheet file types listed in this table. When creating a new sheet file, the user will determine which of the six categories listed above best describes the new sheet file and will choose the appropriate seed file. Each type of sheet that can be created within the drawing plan set will be assigned its own unique sheet designator code. This code will be used in the sheet file name, as outlined in the examples shown under Task 1.11.1 above. The sheet designator codes for each sheet file type are listed in the tables below:

Bridge Sheet Types	Discipline	Sheet Designator Code
Details	Bridge	BR__*
Foundation Investigation	Bridge / Materials	BR__*
Notes	Bridge	BR__*
Rebar	Bridge	BR__*
Situation and Layout	Bridge	BR__*

**The spaces in the naming convention for the Bridge sheet types indicate where a two-character code will be inserted to denote the location of the bridge in the roadway project.*

General Sheet Types	Discipline	Sheet Designator Code
Notes	General	NOTE
Standard Drawing Index	General	INDX
Special Drawings	General	SPEC
Standard Drawings	General	STAN
Title	General	TITL
Vicinity Sketch	General	VICN

Landscape Sheet Types	Discipline	Sheet Designator Code
Details	Landscape/Rdwy	LDTL
Irrigation Plans	Landscape/Rdwy	IRRG
Landscape Plans	Landscape/Rdwy	LAND
Schedules	Landscape/Rdwy	SCHD

Materials Sheet Types	Discipline	Sheet Designator Code
Foundation Investigation	Materials	(See Bridge)
Source Plat	Materials	SPLT

Right-of-Way Sheet Types	Discipline	Sheet Designator Code
Record of Survey	ROW / Rdwy	RSRV
Right-of-Way Plat	ROW / Rdwy	RPLT

Roadway Sheet Types	Discipline	Sheet Designator Code
Bike Lanes/Pedestrian Path Plans	Roadway	BIKE
Details	Roadway	RDTL
Drainage Plans	Roadway	DRAN
Environmental Plans	Roadway/Env	ENVR
Erosion Control Plans	Roadway	ERCO
Minor Structures Plans	Roadway	MSTR
Plan	Roadway	PLAN
Plan and Profile	Roadway	PLPR
Profile	Roadway	PROF
Typical Section	Roadway	TYPI

Total Ownership Map	Roadway	OMAP
Utilities Plans	Roadway	UTIL

State Maintenance Group	Discipline	Sheet Designator Code
State Maintenance Group	Materials	SMGR

Summary Sheet Types	Discipline	Sheet Designator Code
Project Clearance Summary	Roadway	PRSM
Pipe Culvert Summary	Roadway	PCSM
Pipe Underdrain Summary	Roadway	PUSM
Irrigation Pipe Summary	Roadway	IRSM
Sewer Pipe Summary	Roadway	SPSM
Pipe Siphon Summary	Roadway	PSSM
Sign Erection Summary	Roadway	SESM
Roadway Sum. and Continuation	Roadway	RSSM
Bridge Summary	Bridge	BSSM

Traffic Sheet Types	Discipline	Sheet Designator Code
Details	Traffic	TDTL
Illumination Materials List	Traffic	ILMT
Illumination Plans	Traffic	ILPL
Traffic Signalization Materials List	Traffic	TSML
Traffic Signal Plans	Traffic	TSPL
Railroad Signals and Crossings	Traffic	RAIL
Signing Erection Specifications	Traffic	SNER
Signing Plans	Traffic	SNPL
Pavement Marking, Delineation and Raised Channelization	Traffic	PVMK
Traffic Control Plans	Traffic	TRCP

The level structures for each of the six primary sheet file types are outlined in Appendix A.

1.11.3 Sheet File Creation Workflow

ITD has traditionally referred to the various design files that contain sheet borders as sheet files. This terminology will be used differently, however, once the new standard is implemented. The files that contain sheet borders will now be referred to as border files, and will be saved with the .BDR file extension.

The new definition for sheet files, as explained in the description of Task 1.10.1 above, are design files that contain annotation and elements that are specific to one page in the plan set. When plotted, these files become the documents that the engineer signs and that are used as a blueprint for the construction of the project. Sheet files will be stored with the .SHT file extension.

ITD uses several different types of sheets. The workflow that is currently used to create sheet files depends largely on sheet type and purpose. Following is a brief summary of the current sheet file creation practices.

Title Sheets
There is only one title sheet per project. The title sheet prototype is typically copied to the project directory and is modified to include the project's title information.

Plan, Profile, Plan & Profile and Typical Section Sheets
Plan sheet design files are created in the project directory and are used as a container for reference file attachments and sheet-specific information. Various model design files are referenced to these sheet files, along with the Plan_0502, Profile_0502, Plan_Profile_0502, or Typical_Section_0502 border files, depending on the application and purpose of the sheet. All of the above mentioned border files reside in the project folder.

Summary Sheets
There are a variety of specialized sheet file prototypes that are designed for the display of project summary information. These specialty sheet files contain a title block and border and various types of tables, depending on the type of summary that is being generated. The approved list of summary file types include the following:

- Project clearance summaries
- Sign erection summaries
- Roadway summaries
- Roadway summary continuation
- Bridge summaries
- Pipe culvert summaries
- Pipe underdrain summaries
- Irrigation pipe summaries
- Sewer pipe summaries
- Pipe siphon summaries

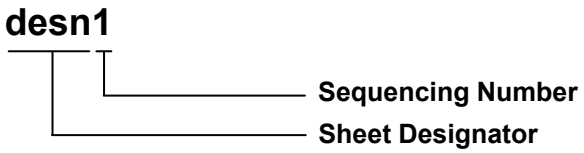
Due to the amount of tabular information that must be included in summary sheets, these prototypes are typically used as seed files or are copied into the project folder and edited in place. Generally, no design data is referenced to summary sheets.

Future Sheet Creation Workflows
Once the new CADD standards are implemented, users will be strongly encouraged to create sheet files using one of the standard sheet seed files that are listed in the table in the description under Task 1.11.2 above. The approved workflow for the creation of

sheet files will be to reference one of the standard border files to the sheet design file, along with one or more model design files. Together, these references will constitute the "design image" of the sheet. The Bridge Section, however, will continue for now to use its current sheet creation workflow, which includes copying the title block and border into the sheet and constructing the design image directly on the sheet rather than employing reference file attachments for this purpose.

1.12.1 Standard Reference File Logical Names and Descriptions

Current ITD standards do not prescribe any reference file logical naming conventions. However, when the new CADD standards are implemented, logical names will use the sheet designator code for the type of design file represented by the attachment, followed by a sequencing number to differentiate between reference file attachments of the same file type. An example of this convention is shown in the example below:



The description for the reference file attachment will include the route number, a brief explanation of what is being displayed from the attached design file, and the station range (if appropriate), as shown in the example below:

I-15 design model from 12+00 to 13+00

1.12.2 Reference File Use Policies

Based on what has been uncovered during the standards review process, there have not been any firm policies pertaining to how reference files are used at the Idaho Transportation Department. All engineers and designers who do project work generally have access to relevant design files for reference purposes, which is a necessity if project collaboration is to be effective. In the absence of a workspace configuration, however, some local storage of design files and mass storage of design files in the same folder location within the project directory structure has occurred. This has been done to assure the reattachment of reference files during the start of a design session.

The workflow used to create sheet files has not been widely regulated, although many districts and discipline groups are, as a matter of course, currently using reference file attachments to assemble their sheet design files. The use of reference file attachments for sheet file assembly will be considered standard procedure. However, due to established and well-entrenched practices, the Bridge Section will not be inclined to use this workflow, at least initially. To accommodate this special case, alternative sheet creation policies will be implemented that will allow the Bridge Section to construct sheets without the use of reference file attachments.

Reference file logical name and description standards have not been employed to date, although these naming conventions will be included in the new CADD standards.

1.12.3 Reference File Attachment Methods

ProSoft has examined sample design files to verify common practices used in their construction. These examinations have determined that reference file attachments have been made using both of the standard attachment methods. For cross-referencing of model file design data, the coincident attachment method is used to line up the coordinate bases of the two model files. For sheet file construction, both coincident and saved view attachments are used. Both attachment methods will continue to be necessary.

1.12.4 Reference File Storage Locations

As mentioned previously, the workspace configuration must be built upon a consistent data structure in order to function properly. The standard project directory structure, which is described under Task 1.6.1, has been set up to segregate design files by design discipline. This allows access rights to be established and provides a logical organizational structure for project data. Design files can be stored in each of the folder locations shown in the table below:

Discipline or Category	Design File Storage Location
Construction	Prjnn\Construction\As_Builts
Environmental	Prjnn\Environmental
Maintenance	Prjnn\Maintenance
Bridge	Prjnn\Project_Development\Bridge
Existing	Prjnn\Project_Development\Existing
Hydraulics	Prjnn\Project_Development\Hydraulics
Landscape	Prjnn\Project_Development\Landscape
Location	Prjnn\Project_Development\Location
Materials	Prjnn\Project_Development\Materials
Minor Structures	Prjnn\Project_Development\Minor_Structures
Plan_Sheets	Prjnn\Project_Development\Plan_Sheets
Project Resources	Prjnn\Project_Development\Project_Resources
Right-of-Way	Prjnn\Project_Development\Right_of_Way
Roadway	Prjnn\Project_Development\Roadway
Traffic	Prjnn\Project_Development\Traffic
Utilities	Prjnn\Project_Development\Utilities
Public Involvement	Prjnn\Public Involvement
Visualization	Prjnn\Visualization

The workspace configuration will manage the reattachment of reference files from any of these storage locations.

1.13.1 Standard Text Style Naming Conventions for NetSPEX

Among the unique features of NetSPEX is its ability to store text and dimension styles in the CADD standards database, which eliminates the need to maintain text styles as CADD resources. Components in NetSPEX will be assigned to these named styles to ensure that text is placed with the proper settings.

NetSPEX text styles will be named using the letters “itd” as a prefix, followed by the text height, coupled with the word “text”. The components of the name will be separated by an underscore, as shown below:

1.13.2 Fonts to be Included in the Standard Font Library

The current font library contains several standard MicroStation fonts, most of which are not used in drawings produced for plan sets. Following are the fonts that have been approved for use with the new CADD standards:

Standard Fonts	Description
Font 130	Standard engineering style font
Font 24	Italics font

The annotation in the title block will contain additional fonts and text sizes. Some True Type fonts may be included in the font library and used in production drawings. However, the specific fonts to be included have not yet been identified. A determination of which True Type fonts to include will be made at the time the font resource file is created.

1.13.3 Standard Plotted Text Sizes

Only a few text sizes have been approved for use with the new English unit CADD standards. These sizes are shown in the table below:

Standard Text Sizes
.07*
.08
.1
.12

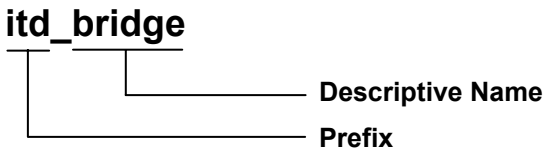
**Allowed in only certain special cases*

NetSPEX annotation components will automatically adjust the text size according to the active drawing scale to ensure, when the drawing is plotted, that text is scaled to one of the standard sizes shown in the table above.

1.14.1 Standard Dimension Style Naming Conventions for NetSPEX

Much like text styles, NetSPEX can store dimension settings as styles in the CADD standards database, which eliminates the need to maintain dimension styles as CADD resources. Components in NetSPEX will be assigned to these named dimension styles to ensure that dimensions are placed with the proper size and appearance. Where possible, dimensions have been assigned to the same level in all drawing types to reduce the number of unique dimension styles that will have to be maintained.

NetSPEX dimension styles will be named using the letters “itd” as a prefix, followed by a descriptive name. The components of the name will be separated by an underscore, as shown in the example below:



1.14.2 Drawing Types with Dimensions

Several drawing types will require the use of dimensions. The table below contains a list of model and sheet types that have dimension levels and that will require access to NetSPEX dimension components.

Drawing Types That Require Dimensions
Model Files
Minor Structures
Profile
Structures
Typicals
Sheet Files
Details
Diagrams and Schematics
Note Sheets
Plan Sheets
Summary Sheets

1.14.2 Standard Dimension Settings

Two dimension styles will be created. Most engineering disciplines will use the standard ITD dimension style. However, because its drawings differ from that of other engineering disciplines, the Bridge Section will have its own unique dimension style. The dimension settings for these two styles are shown in the table below. These settings will be entered into the NetSPEX CADD standards database as dimension styles. The styles will, in turn, be referenced by NetSPEX dimension components to ensure that dimensions are placed in accordance with CADD standards.

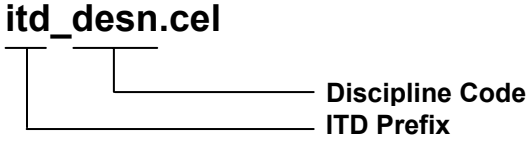
Setting	Standard	Bridge
Custom Symbols		
Prefix	None	None
Suffix	Symbol (Char:', Font 130)	None
Diameter	Symbol (Char:~, Font 130)	Symbol (Char: ?, Font 24)
Plus/Minus	Default	Symbol (Char: `, Font 24)
Main Prefix	None	None
Main Suffix	None	None
Tol. Prefix	None	None
Tol. Suffix	None	None
Upper Prefix	None	None
Upper Suffix	None	None
Lower Prefix	None	None
Lower Suffix	None	None
Dimension Lines		
Level Check Box	On (59)	On (54)
Override Level Symbology Check Box	Off	Off
Geometry Stack Offset	0:0	0:0
Color Check Box	On (color 0)	On (color 2)
Style Check Box	On (style 0)	On (style 0)
Weight Check Box	On (weight 0)	On (weight 0)
Extension Lines		
Extension Lines Check Box	On	On
Join When Text Outside Check Box	On	Off
Geometry Offset	0.500000	0.500000
Geometry Extension	0.750000	0.750000
Color Check Box	On (color 0)	On (color 2)
Style Check Box	On (style 0)	On (style 0)
Weight Check Box	On (weight 0)	On (weight 0)
Placement		
Alignment	Drawing	Drawing
Location	Semi-Auto	Manual
Adjust Dimension Line Check Box	On	Off
Reference File Units	Off	Off

Relative Dimension Line	Off	Off
Center Size	0:0	0:0
Terminators		
Terminators	Automatic	Automatic
Arrowhead	Filled	Filled
Geometry Width	1.500000	1.000000
Geometry Height	0.500000	0.375000
Geometry Min. Leader	2.000000	1.750000
Color Check Box	On (color 0)	On (color 2)
Style Check Box	On (style 0)	On (style 0)
Weight Check Box	On (weight 0)	On (weight 0)
Terminator Symbols		
Arrow	Default	Cell (TERM)
Stroke	Default	Default
Origin	Default	Default
Dot	Default	Default
Text		
Orientation	Above	Above
Justification	Center	Center
Text Frame	None	None
Margin	0.500000	0.500000
Underline Text NTS Check Box	Off	Off
Color Check Box	On (color 0)	On (color 2)
Weight Check Box	On (weight 0)	On (weight 1)
Font Check Box	On (130)	On (font 24)
Height Check Box (Unlocked)	0.08	0:0
Width Check Box (Unlocked)	0.08	0:0
Tolerance		
Tolerance Generation	Off	Off
Type	Plus/Minus	Plus/Minus
Upper	0.00	0:0
Lower	0.00	0:0
Text Size	1.000000	1.000000
Lower Margin	0.500000	0.500000
Upper Margin	0.500000	0.500000
Left Margin	0.500000	0.500000
Sep. Margin	0.500000	0.500000
Tool Settings		
All Settings	Default	Default
Left Extension Check Box	On	On
Right Extension Check Box	On	On

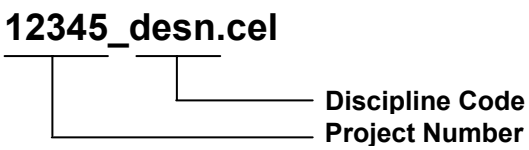
Stack Dimension Check Box	Off	Off
Arc Symbol Check Box	Off	Off
Units		
Format	Mechanical	AEC
Primary Units	English	English
Accuracy	0.12	1/16
Label	Off	x'-x"
Secondary Units	Off	Off
Units	NA	NA
Accuracy	NA	NA
Label	NA	NA
Scale Factor	1.0000	1.0000
Unit Format		
Angle Format Units	Degrees	Degrees
Angle Format Accuracy	0	0
Angle Format Display	DD^MM'SS"	DD^MM'SS"
Use Comma for Decimal Check Box	Off	Off
Unit Separation Check Box	Off	Off
Show Leading Zero Check Box (Prim.)	On	On
Show Trailing Zeros Check Box (Prim.)	Off	Off
Show Leading Zero Check Box (Sec.)	Off	Off
Show Trailing Zeros Check Box (Sec.)	Off	Off

1.15.1 Cell Library Naming Conventions

Cells will be organized into smaller and more manageable cell libraries for each engineering discipline. This will enable the workspace to more easily load symbol resources that are appropriate for each discipline and drawing type. Standard cell libraries will be named using the letters “itd” as a prefix, an underscore character, and a code to denote the discipline, as shown in the example below:



If cell libraries are needed for a specific project, the name will include the project number, as shown in the example below:



1.15.2 Cell Drawing Type Assignments

Most of the new ITD drawing types will have cells assigned to them. In some instances, the same cell may be assigned to multiple drawing types. Cells will be delivered for placement through the NetSPEX Designer interface. When symbol components are selected, NetSPEX Designer will query the CADD standards database for the cell name and the name of the cell library from which it is to be extracted.

A comprehensive list of cells and their drawing type assignments is found in the table under the description for Task 1.15.3 below.

1.15.3 Cell Level Placement

Level assignments for cells are displayed in the table below.

Note: This table includes the names of cells that have been defined at the time of the completion of this report. Other cells will likely be added as additional drawing types are completed.

CELL NAME	LEVEL NAME	NUMBER	DESCRIPTION
DESIGN			
ANGPT	RDWY_HORPNTS	12	PI's
ATTENP	RDWY_BARRIER	12	Attenuators
BENCH	SURV_POINT	3	Benchmarks
FLAG	STRC_MISC	35	Flagpoles
MBARP	RDWY_BARRIER	12	Median Barriers
MEAS	SURV_POINT	3	Set Measurement Point
PCPNT	RDWY_HORPNTS	12	PC's
REBR4S	SURV_POINT	3	Set 1/2" Rebar
REBR5S	SURV_POINT	3	Set 5/8" Rebar
RRDEVP	STRC_RAIL	36	Railroad Protective Devices
RRLITP	STRC_RAIL	36	Railroad Signal Light
RRP	STRC_RAIL	36	Railroad 1 Track
RRSWP	STRC_RAIL	36	Railroad Switch
SBRASS	SURV_POINT	3	Set Brass or Alloy Cap
HYDRO			
CATBNP	STRUC_HYDRAUL	30	Catch Basins
CULVP	STRUC_HYDRAUL	30	Pipe Culverts
EMBNKP	STRUC_HYDRAUL	30	Embankment Protectors
INLETP	STRUC_HYDRAUL	30	Inlets
RIPRAP	STRUC_HYDRAUL	30	Riprap
SIPHP	STRUC_HYDRAUL	30	Siphons
SSLINP	STRUC_HYDRAUL	30	Storm Sewer Lines
SSMHLP	STRUC_HYDRAUL	30	Storm Sewer Manholes
UDRAIN	STRUC_HYDRAUL	30	Underdrains
ILLUMINATION			
EPOLEP	ILLMP_CTRLR	34	Power Source
EPOLEX	ILLMX_CTRLR	10	Power Source

ESPEDP	ILLMP_CTRLR	34	Electrical Service Pedestal
ESPEDX	ILLMX_CTRLR	10	Electrical Service Pedestal
ILCOMP	ILLMP_COMPJBOX	28	Illumination Composite Junction Box
ILCOMX	ILLMX_COMPJBOX	4	Illumination Composite Junction Box
ILCONP	ILLMP_CONCJBOX	27	Illumination Concrete Junction Box
ILCONX	ILLMX_CONCJBOX	3	Illumination Concrete Junction Box
ILHEDP	ILLMP_LUMHEAD	26	Luminaire Head
ILHEDX	ILLMX_LUMHEAD	2	Luminaire Head
ILPOLP	ILLMP_POLE	25	Pole
ILPOLX	ILLMX_POLE	1	Pole
PROFILE			
ANGPT	RDWY_VERTPNTS	13	PVI's
ANGPT	RDWY_VERTPNTS	13	Vertical Angle Point
ANGPT	RDWY_VERTPNTS	13	Vertical Event Points
ARCHP	STRC_PIPE	30	Pipe Arch
BENCH	SURV_POINT	1	Benchmark
CULVP	STRC_PIPE	30	Pipe Culvert
EGUYP	UTIL_ELEC	42	Electrical Pole Anchor
EJBXP	UTIL_ELEC	42	Electrical Junction Box
ELINEP	UTIL_ELEC	42	Electrical Cable
EMTRP	UTIL_ELEC	42	Electrical Meter
EPOLEP	UTIL_ELEC	42	Electrical Pole
ETWRP	UTIL_ELEC	42	Electrical Transmission Tower
FHYDP	UTIL_WATER	47	Fire Hydrant
FOJBXP	UTIL_FIBOPTIC	41	Fiber Optic Junction Box
FOLINP	UTIL_FIBOPTIC	41	Fiber Optic Cable
FOTWRP	UTIL_FIBOPTIC	41	Fiber Optic Transmission Tower
GLINEP	UTIL_GAS	45	Gas Pipe
GMTRP	UTIL_GAS	45	Gas Meter
GPMPP	UTIL_GAS	45	Gas Pump
GRSRP	UTIL_GAS	45	Gas Riser
GVLVP	UTIL_GAS	45	Gas Valve
IRLINP	UTIL_IRRIG	49	Irrigation Pipe
IRMHLP	UTIL_IRRIG	49	Irrigation Pipe Manholes
IRPMPP	UTIL_IRRIG	49	Irrigation Pumps
IRRSRP	UTIL_IRRIG	49	Irrigation Risers
IRSIPP	UTIL_IRRIG	49	Irrigation Siphons
IRVLVP	UTIL_IRRIG	49	Irrigation Valves
LPOLEP	UTIL_ELEC	42	Luminaire Pole
OLINEP	UTIL_PETRO	46	Oil Pipe
ORSRP	UTIL_PETRO	46	Oil Riser
OVLVP	UTIL_PETRO	46	Oil Valve
PCPNT	RDWY_VERTPNTS	13	PVC's
PCPNT	RDWY_VERTPNTS	13	PVT's
PIPEP	UTIL_PIPEBELL	43	Pipe with Directional Bell
PIPEP	UTIL_PIPE	44	Pipe
SIPHP	STRC_PIPE	30	Pipe Siphon

SNLINP	UTIL_SEWER	48	Sanitary Sewer Pipe
SNMHLP	UTIL_SEWER	48	Sanitary Sewer Manhole
TGUYP	UTIL_TELE	40	Telephone Pole Anchor
TJBXP	UTIL_TELE	40	Telephone Junction Box
TLINEP	UTIL_TELE	40	Telephone Cable
TPOLEP	UTIL_TELE	40	Telephone Pole
TTWRP	UTIL_TELE	40	Telephone Transmission Tower
WELLP	UTIL_WATER	47	Well
WLINEP	UTIL_WATER	47	Water Pipe
WMTRP	UTIL_WATER	47	Water Meter
WRSRP	UTIL_WATER	47	Water Riser
WVLVP	UTIL_WATER	47	Water Valve
RIGHT-OF-WAY			
BENCH	BNDYX_MISCPNT	3	Benchmarks
BENCH	BNDYP_MISCPNT	25	Bench Marks
FBRASS	BNDYX_SURVPNT	1	Found Brass or Alloy Cap
FDQTR	BNDYX_SURVPNT	1	Quarter Corners
FDQTR	BNDYX_SURVPNT	1	1/16 Corners
FDQTR	BNDYP_SURVPNT	23	Quarter Corners
FDQTR	BNDYP_SURVPNT	23	1/16 Corners
FDSEC	BNDYX_SURVPNT	1	Section Corners
FDSEC	BNDYP_SURVPNT	23	Section Corners
IRPIPEF	ROWX_PROPPNT	10	Found Iron Pipe
IRPIPES	ROWP_PROPPNT	32	Set Iron Pipe
MEAS	BNDYX_MISCPNT	3	Traverse Control
MEAS	BNDYX_POLPNT	4	Existing Boundary Points
MEAS	BNDYP_MISCPNT	25	Traverse Control
MEAS	BNDYP_POLPNT	25	Proposed Boundary Points
PREMK	BNDYX_MISCPNT	3	Premarks
PREMK	BNDYP_MISCPNT	25	Premarks
PRWMAR	ROWP_PNT	35	R/W Markers
R/W	ROWP_LINE	36	Proposed R/W
R/WX	ROWX_LINE	14	Existing R/W
REBR4F	ROWX_PROPPNT	10	Found 1/2" Rebar
REBR4S	ROWX_PROPPNT	10	Set 1/2" Rebar
REBR4S	ROWP_PROPPNT	32	Set 1/2" Rebar
REBR5F	ROWX_PROPPNT	10	Found 5/8" Rebar
REBR5S	ROWX_PROPPNT	10	Set 5/8" Rebar
REBR5S	ROWP_PROPPNT	32	Set 5/8" Rebar
RR_R/W	ROWP_LINE	36	Proposed Railroad R/W
RRR/WX	ROWX_LINE	14	Existing Railroad R/W
RWMONX	ROWX_PNT	13	R/W Markers
SBRASS	BNDYP_SURVPNT	23	Set Brass or Alloy Cap
STONE	BNDYX_SURVPNT	1	Found Set Stone
STONE	BNDYP_SURVPNT	23	Found Set Stone
SIGNALS			
DCOMBP	DETP_COMPJBOX	38	Detection Composite Junction Box

DCOMBX	DETX_COMPJBOX	14	Detection Composite Junction Box
DCONBP	DETP_CONCJBOX	37	Detection Concrete Junction Box
DCONBX	DETX_CONCJBOX	13	Detection Concrete Junction Box
DCP	DETP_CONDUIT	41	Detection Conduit
DCX	DETX_CONDUIT	17	Detection Conduit
DETVCP	DETP_CAMERA	40	Video Detection Camera
DETVCX	DETX_CAMERA	16	Video Detection Camera
DETVZP	DETP_VIDEOZONE	42	Video Detection Zone
DETVZX	DETX_VIDEOZONE	18	Video Detection Zone
DEVPCP	DETP_EMERCOND	45	Emergency Vehicle Preemption Conduit
DEVPCX	DETX_EMERCOND	21	Emergency Vehicle Preemption Conduit
DTEVPP	DETP_EMERDET	46	Emergency Vehicle Preemption Detector
DTEVPX	DETX_EMERDET	22	Emergency Vehicle Preemption Detector
DTLOPP	DETP_LOOP	43	Detection Loop
DTLOPX	DETX_LOOP	19	Detection Loop
EPOLEP	SGNLP_CTRLR	34	Power Source
EPOLEX	SGNLX_CTRLR	10	Power Source
ESPEDP	SGNLP_CTRLR	34	Electrical Service Pedestal
ESPEDX	SGNLX_CTRLR	10	Electrical Service Pedestal
HVSPAP	SGNLP_HVLTSPARE	31	High Voltage Spare
HVSPAX	SGNLX_HVLTSPARE	7	High Voltage Spare
LVSPAP	DETP_LVLTSPARE	44	Low Voltage Spare
LVSPAX	DETX_LVLTSPARE	20	Low Voltage Spare
RRSPCP	SGNLP_RAILCOND	35	Railroad Signal Preemption Conduit
RRSPCX	SGNLX_RAILCOND	11	Railroad Signal Preemption Conduit
SCBSPP	SGNLP_CTRLR	34	Signal Controller Cabinet & Elec. Service Ped.
SCBSPX	SGNLX_CTRLR	10	Signal Controller Cabinet & Elec. Service Ped.
SCCABP	SGNLP_CTRLR	34	Signal Controller Cabinet
SCCABX	SGNLX_CTRLR	10	Signal Controller Cabinet
SCOMBP	SGNLP_COMPJBOX	28	Signal Composite Junction Box
SCOMBX	SGNLX_COMPJBOX	4	Signal Composite Junction Box
SCONBP	SGNLP_CONCJBOX	27	Signal Concrete Junction Box
SCONBX	SGNLX_CONCJBOX	3	Signal Concrete Junction Box
SCP	SGNLP_CONDUIT	30	Signal Conduit
SCX	SGNLX_CONDUIT	6	Signal Conduit
SINTBP	SGNLP_INCONJBOX	33	Signal Interconnect Junction Box
SINTBX	SGNLX_INCONJBOX	9	Signal Interconnect Junction Box
SINTCP	SGNLP_INCONCOND	32	Signal Interconnect Conduit
SINTCX	SGNLX_INCONCOND	8	Signal Interconnect Conduit
SPED1P	SGNLP_HEAD	26	Pedestrian Head, 1
SPED1X	SGNLX_HEAD	2	Pedestrian Head, 1
SPED2P	SGNLP_HEAD	26	Pedestrian Heads, 2
SPED2X	SGNLX_HEAD	2	Pedestrian Heads, 2
SPOLEP	SGNLP_POLE	25	Pole
SPOLEX	SGNLX_POLE	1	Pole
SRCABP	SGNLP_CTRLR	35	Signal Railroad Cab
SRCABX	SGNLX_RAILCOND	11	Signal Railroad Cab

SVEH5P	SGNLP_HEAD	26	Signal Head, 5 Section Cluster (doghouse)
SVEH5X	SGNLX_HEAD	2	Signal Head, 5 Section Cluster (doghouse)
SVEHVP	SGNLP_HEAD	26	Signal Head-Vertical 3,4,5 Section
SVEHVX	SGNLX_HEAD	2	Signal Head-Vertical 3,4,5 Section
SOILS PROFILE			
ANGPT	RDWY_VERTPNTS	13	PVI's
ANGPT	RDWY_VERTPNTS	13	Vertical Angle Point
ANGPT	RDWY_VERTPNTS	13	Vertical Event Points
ARGBRK	BORING_SYMB	33	Broken Argillite Bedrock
ARGK	BORING_SYMB	33	Argillite Bedrock
ARGWEA	BORING_SYMB	33	Weathered Argillite Bedrock
ASPLT	BORING_SYMB	33	Asphalt
BASALT	BORING_SYMB	33	Basalt Bedrock
BASBRK	BORING_SYMB	33	Broken Basalt Bedrock
BASWEA	BORING_SYMB	33	Weathered Basalt Bedrock
BEDRK	BORING_SYMB	33	Broken Bedrock
BOLDR	BORING_SYMB	33	Boulder - Large Rock
BSLTF	BORING_SYMB	33	Basalt Fractured
BSLTS	BORING_SYMB	33	Basalt Scoriaceous
CH	BORING_SYMB	33	Clays - Organic
CL	BORING_SYMB	33	Clays - Medium
CLAY	BORING_SYMB	33	Sandy or Silty Clay
CLAYFT	BORING_SYMB	33	Fat Clays
CLINO	BORING_SYMB	33	Clays - Inorganic
CLSLT	BORING_SYMB	33	Clayey Silt
CLSND	BORING_SYMB	33	Clayey Sand
CLSTCT	BORING_SYMB	33	Clay Silt w clasts
CLYSLT	BORING_SYMB	33	Claystone - Siltstone
COBBLE	BORING_SYMB	33	Cobble - Medium Rock
CONAGG	BORING_SYMB	33	Concrete Aggregate
CONCRT	BORING_SYMB	33	Concrete Hardened
CRBASE	BORING_SYMB	33	Crushed Base Material
DATA	BORING_LOG	32	Test Data
DIBAS	BORING_SYMB	33	Diced Basalt
DLMIT	BORING_SYMB	33	Dolomite
FRBDRK	BORING_SYMB	33	Fractured Bedrock
FRTZN	BORING_SYMB	33	Fracture Zone - Highly Broken
GC	BORING_SYMB	33	Clayey Gravel
GM	BORING_SYMB	33	Silty Gravel
GNEISS	BORING_SYMB	33	Gneiss Bedrock
GNTBRK	BORING_SYMB	33	Broken Granite Bedrock
GNTWEA	BORING_SYMB	33	Weathered Granite Bedrock
GP	BORING_SYMB	33	Sandy Gravel
GRASND	BORING_SYMB	33	Sandy Gravel
GRAVCL	BORING_SYMB	33	Clayey Gravel
GRAVEL	BORING_SYMB	33	Gravel - Little or No Fines
GRDIO	BORING_SYMB	33	Granodiorite

GRNT	BORING_SYMB	33	Granite Bedrock
GRSASL	BORING_SYMB	33	Silty Sandy Gravel
GRSILT	BORING_SYMB	33	Silty Gravel
GRVSND	BORING_SYMB	33	Gravelly Sand
GW	BORING_SYMB	33	Well Graded Gravel
GWE	BORING_SYMB	33	Ground Water Elevation
GYP	BORING_SYMB	33	Gypsum
HOLE	BORING_LOG	32	Test Hole
LEGD	BORING_LOG	32	Test Hole Legend
LINE	BORING_LOG	32	Test Hole Data Line
LMSTN	BORING_SYMB	33	Linestone
MARBLE	BORING_SYMB	33	Marble
MARSH	BORING_SYMB	33	Marsh - Soggy and Wet
MHINO	BORING_SYMB	33	Inorganic Silts
ML	BORING_SYMB	33	Fine Silts
OH	BORING_SYMB	33	Organic Clays
OL	BORING_SYMB	33	Organic Silts - Silty Clays
PCPNT	RDWY_VERTPNTS	13	PVC's
PCPNT	RDWY_VERTPNTS	13	PVT's
PEAT	BORING_SYMB	33	Peat - Highly Organic Material
QTZBRK	BORING_SYMB	33	Quartzite Bedrock - Broken
QTZWEA	BORING_SYMB	33	Quartzite Bedrock - Weathered
QUARTZ	BORING_SYMB	33	Quartzite Bedrock
RHYBRK	BORING_SYMB	33	Rhyolite Bedrock - Broken
RHYOLT	BORING_SYMB	33	Rhyolite Bedrock
RHYWEA	BORING_SYMB	33	Rhyolite Bedrock - Weathered
ROCK	BORING_SYMB	33	Rock - Cobble to Boulder
ROCKCP	BORING_SYMB	33	Rock Cap
ROCKCR	BORING_SYMB	33	Crushed or base material
SAGRSL	BORING_SYMB	33	Sandy Gravel Silt
SALT	BORING_SYMB	33	Salt
SAND	BORING_SYMB	33	Sand
SANDCL	BORING_SYMB	33	Sand - Clayey
SANDGR	BORING_SYMB	33	Sand - Gravelly
SANDSL	BORING_SYMB	33	Sand - Silty
SCHIST	BORING_SYMB	33	Sandy Clay
SCHIST	BORING_SYMB	33	Schist
SHALE	BORING_SYMB	33	Shale
SILT	BORING_SYMB	33	Silt - Sandy or Clayey
SM	BORING_SYMB	33	Silty Sand
SNDLM	BORING_SYMB	33	Sandy Limestone
SNDSLT	BORING_SYMB	33	Sandy Silt
SNDSTN	BORING_SYMB	33	Sandstone
SP	BORING_SYMB	33	Poorly Graded Sand
SUBG	BORING_LOG	32	Subgrade Symbol
SUMM	BORING_LOG	32	Soil Summary Chart
SW	BORING_SYMB	33	Well Graded Sand

TERM	BORING_LOG	32	Terminator
WATER	BORING_SYMB	33	Water
WLEV	BORING_SYMB	33	Water Level Elevation
STRUCTURES			
AASHO1	STRC_OBJLINE	1	ASSHTO Type 1 Girder
AASHO2	STRC_OBJLINE	1	ASSHTO Type 2 Girder
AASHO3	STRC_OBJLINE	1	ASSHTO Type 3 Girder
AASHO4	STRC_OBJLINE	1	ASSHTO Type 4 Girder
ANSI32	STRC_PATT	7	Cross Hatching
BAR	STRC_REBAR	3	Negative Moment Bar 2
BIKERL	STRC_OBJLINE	1	4 Ft 6 In Rail
BLBT60	STRC_OBJLINE	1	60 Bulb Tee Girder
BLBT66	STRC_OBJLINE	1	66 Bulb Tee Girder
BLTPLN	STRC_OBJLINE	1	Bolt Plan for 1 IN Dia
BOLT	STRC_OBJLINE	1	.500 X 4 Inch Bolt
BOLT1	STRC_OBJLINE	1	Bolt Head for 1 IN Dia
CARF	STRC_OBJLINE	1	Front View of Sedan
CARR	STRC_OBJLINE	1	Rear View of Sedan
CHNL	STRC_OBJLINE	1	C 15x33.9 Channel
CHNL1	STRC_OBJLINE	1	C 12x30 Channel
CONC	STRC_PATT	7	Concrete Symbol
CONC3	STRC_PATT	7	1FT x 1FT Conc Symbol
CONC4	STRC_PATT	7	2FT x 2FT Conc Square
CONCP1	STRC_PATT	7	Concrete Panel 1 Gr
CONCP2	STRC_PATT	7	Concrete Panel 2 Gr
CONCP3	STRC_PATT	7	Concrete Panel 3 Blk
CONCSQ	STRC_PATT	7	Concrete Square Shape
CRANK1	STRC_REBAR	3	Long Crank Bar
CRANK2	STRC_REBAR	3	Short Crank Bar
CUT	STRC_OBJLINE	1	Cut Line 1 FT Long
CUT1	STRC_OBJLINE	1	Cut Line W 1 Squiggle
DH	ANNO_GENNOTE	54	Drill Hole Symbol
DIRECT	ANNO_GENNOTE	54	Traffic Direction Symbol
DRAIN1	STRC_OBJLINE	1	Deck Drain Type 1
DRAIN2	STRC_OBJLINE	1	Deck Drain Type 2
EARTH	STRC-GRNDLN	6	36FT Long x 96FT HI Sym
EARTH1	STRC-GRNDLN	6	Natural Ground
EARTH2	STRC-GRNDLN	6	Natural Ground Square
EXPJT	STRC_OBJLINE	1	Type C Joint
HOOK	STRC_REBAR	3	Hooked Rebar
HP1057	STRC_OBJLINE	1	HP 10 x 57 H Pile
HP117	STRC_OBJLINE	1	HP 14 x 117 H Pile
HP1253	STRC_OBJLINE	1	HP 12 x 53 H Pile
HP1263	STRC_OBJLINE	1	HP 12 x 63 H Pile
HP1274	STRC_OBJLINE	1	HP 12 x 74 H Pile
HP1473	STRC_OBJLINE	1	HP 14 x 73 H Pile
HP1489	STRC_OBJLINE	1	HP 14 x 89 H Pile

HYDRO	STRC_OBJLINE	1	1IN Eq 1FT Hydro Demol
LDRBRK	ANNO_GENNOTE	54	Leader End Break
MEDIAN	STRC_OBJLINE	1	Std Median Barrier
MINCLR	ANNO_GENNOTE	54	Minimum Clearance
NORTH	ANNO_GENNOTE	54	North Arrow
NUT	STRC_OBJLINE	1	1 IN Dia Nut
NUTPLN	STRC_OBJLINE	1	Plan View of 1 In Dia
PEDRL	STRC_OBJLINE	1	3 Ft 6 In Pedestrian R
PIPBRK	STRC_OBJLINE	1	Pipe End Symbol
RAIL	STRC_OBJLINE	1	New Concrete Rail
REBAR	STRC_REBAR	3	Normal 1.5 In Dia Rebar
REINF	STRC_REBAR	3	Reinforcement List Col
ROCK	STRC-GRNDLN	6	Sectioning Symbol
RRRAIL	STRC_OBJLINE	1	100 Lb Railroad Track
SECT	ANNO_GENNOTE	54	Section Symbol
SET	STRC_REBAR	3	Straight Bar Set
SHEET	ANNO_SHEET	50	Sheet 2 to XX for Dec
SHEET1	ANNO_SHEET	50	Sheet 1 for Jan 99
SHEL12	STRC_OBJLINE	1	Sheet Pipe Pile
SHEL14	STRC_OBJLINE	1	Sheet Pipe Pile
SHEL16	STRC_OBJLINE	1	Sheet Pipe Pile
SLAB12	STRC_OBJLINE	1	12 Solid Slab
SLAB15	STRC_OBJLINE	1	15 Voided Slab Girder
SLAB18	STRC_OBJLINE	1	18 Voided Slab Girder
SLAB21	STRC_OBJLINE	1	21 Voided Slab Girder
SLAB26	STRC_OBJLINE	1	26 Voided Slab Girder
STRUP	STRC_REBAR	3	Bent Reinforcing Stirr
STUD	STRC_OBJLINE	1	.75 x 5 In Weld Stud
STUD2	STRC_OBJLINE	1	.75 By 6 Shear Stud
SURCAP	STRC_OBJLINE	1	Survey Cap
TDOTS	STRC_ACTVPTS	8	Std. Writing Spaced Dots
TERM	ANNO_GENNOTE	54	Terminator
THRIBM	STRC_OBJLINE	1	Thrie Beam Rail Section
TIE	STRC_REBAR	3	Rebar Tie Bar
TIEBAR	STRC_REBAR	3	Tiebar W 4 In Leg
TRUCKF	STRC_OBJLINE	1	Front View of Semi
TRUCKR	STRC_OBJLINE	1	Rear View of Semi
W615	STRC_OBJLINE	1	W 6 x 15 W Beam
W620	STRC_OBJLINE	1	W 6 x 20 W Beam
WELDS	ANNO_GENNOTE	54	Welding Symbols
WS14	STRC_OBJLINE	1	Mod Wash Series 14 Gir
WS14EB	STRC_OBJLINE	1	Mod Series 14 End Bloc
TOPOGRAPHY			
ANGPT	RDWY_HORPNTS	13	PI's
ANGPT	RDWY_HORPNTS	13	Angle Point Symbol
ANGPT	RDWY_HORPNTS	13	Event Point Symbol
BUSH	SURF_VEG	28	Bush

CATBNX	STRC_HYDRO	30	Catch Basins
DELX	RDWY_SIGNS	18	Delineator
DMNHLX	STRC_HYDRO	30	Storm Sewer Manholes
DRFLOW	SURF_DITCH	26	Natural Drainage
EMBNKX	STRC_HYDRO	30	Embankment Protectors
FLAG	STRC_MISC	35	Flagpoles
FLOWX	SURF_DITCH	26	Flow Indicator
GPS	SURV_GPS	2	GPS Control Points
GRID	SURV_PHOTGRM	3	Grid Ticks
HDGATE	STRC_HYDRO	30	Headgate
INLET	STRC_HYDRO	30	Inlets
IRRBXX	SURF_DITCH	26	Irrigation Box
ISHLD	RDWY_SIGNS	18	Interstate Shield
MAILX	RDWY_SIGNS	18	Mail Box
MARSH	SURF_WATRFTR	29	Marshland
MATSRC	SURF_MISCFTR	27	Material Source
PCPNT	RDWY_HORPNTS	13	PC's
PCPNT	RDWY_HORPNTS	13	PT's
PHOTO	SURV_PHOTGRM	3	Photo Center
PIPEB	STRC_HYDRO	30	Pipe Culverts
PIPEB	STRC_HYDRO	30	Siphons
PREMK	SURV_PHOTGRM	3	Premark
RIPRAP	STRC_HYDRO	30	Riprap
RRDEVX	STRC_RAIL	36	Railroad Protective Devices
RRLITX	STRC_RAIL	36	Railroad Signal Light
RRSWX	STRC_RAIL	36	Railroad Switch
RRX	STRC_RAIL	36	Railroad 1 Track
RRX	STRC_RAIL	36	Railroad 2 Track
SIGN1X	RDWY_SIGNS	18	Sign 1 Post
SIGN2X	RDWY_SIGNS	18	Sign 2 Post
SPOT	SURF_SPOTELEV	23	Spot Elevations
SPR	STRC_HYDRO	30	Sprinkler
SSHLD	RDWY_SIGNS	18	State Highway Shield
SSLINE	STRC_HYDRO	30	Storm Sewer Lines
STKPIL	SURF_MISCFTR	27	Stockpile Site
STUMP	SURF_VEG	28	Stump
TREE	SURF_VEG	28	Tree
UDRAIN	STRC_HYDRO	30	Underdrains
USHLD	RDWY_SIGNS	18	U.S. Highway Shield
WETLAND	SURF_WATRFTR	29	Wetland
TYPICALS			
ATTENP	RDWY_BARRIER	12	Attenuators
CATBNP	STRUC_PROP	31	Catch Basins
CATBNX	STRUC_EXIST	30	Catch Basins
CULVP	STRUC_PROP	31	Culverts
DMNHLX	STRUC_EXIST	30	Storm Sewer Manholes
EGUYP	UTIL_ELEC	42	Electrical Pole Anchor

EJBXP	UTIL_ELEC	42	Electrical Junction Box
ELINEP	UTIL_ELEC	42	Electrical Cable
EMBNKP	STRUC_PROP	31	Embankment Protectors
EMBNKX	STRUC_EXIST	30	Embankment Protectors
EMTRP	UTIL_ELEC	42	Electrical Meter
EPOLEP	UTIL_ELEC	42	Electrical Pole
ETWRP	UTIL_ELEC	42	Electrical Transmission Tower
FHYDP	UTIL_WATER	47	Fire Hydrant
FL	STRUC_EXIST	30	Pipe Flow Lines
FL	STRUC_PROP	31	Pipe Flow Lines
FOJBXP	UTIL_FIBOPTIC	41	Fiber Optic Junction Box
FOLINP	UTIL_FIBOPTIC	41	Fiber Optic Cable
FOTWRP	UTIL_FIBOPTIC	41	Fiber Optic Transmission Tower
GLINEP	UTIL_GAS	45	Gas Pipe
GRSRP	UTIL_GAS	45	Gas Riser
GVLVP	UTIL_GAS	45	Gas Valve
IRLINP	UTIL_IRRIG	49	Irrigation Pipe
IRMHLP	UTIL_IRRIG	49	Irrigation Manhole
IRPMPP	UTIL_IRRIG	49	Irrigation Pumps
IRRSRP	UTIL_IRRIG	49	Irrigation Risers
IRSIPP	UTIL_IRRIG	49	Irrigation Siphon
IRVLVP	UTIL_IRRIG	49	Irrigation Valves
LPOLEP	UTIL_ELEC	42	Luminaire Pole
MBARP	RDWY_BARRIER	12	Median Barriers
OLINEP	UTIL_PETRO	46	Oil Pipe
ORSRP	UTIL_PETRO	46	Oil Riser
OVLVP	UTIL_PETRO	46	Oil Valve
PIPEB	STRUC_EXIST	30	Culverts
PIPEP	UTIL_PIPEBELL	43	Pipe with Directional Bell
PIPEP	UTIL_PIPE	44	Pipe
RIPRAP	STRUC_EXIST	30	Riprap
RIPRAP	STRUC_PROP	31	Riprap
SNLINP	UTIL_SEWER	48	Sanitary Sewer Pipe
SNMHLP	UTIL_SEWER	48	Sanitary Sewer Manhole
SSLINE	STRUC_EXIST	30	Storm Sewer Lines
SSLINP	STRUC_PROP	31	Storm Sewer Lines
SSMHLP	STRUC_PROP	31	Storm Sewer Manholes
TGUYP	UTIL_TELE	40	Telephone Pole Anchor
TJBXP	UTIL_TELE	40	Telephone Junction Box
TLINEP	UTIL_TELE	40	Telephone Cable
TPOLEP	UTIL_TELE	40	Telephone Pole
TTWRP	UTIL_TELE	40	Telephone Transmission Tower
WELLP	UTIL_WATER	47	Well
WLINEP	UTIL_WATER	47	Water Pipe
WMTRP	UTIL_WATER	47	Water Meter
WRSRP	UTIL_WATER	47	Water Riser
WVLVP	UTIL_WATER	47	Water Valve

UTILITIES			
EGUYP	UTILP_ELEC	22	Electrical Pole Anchor
EGUYX	UTILX_ELEC	3	Power Pole Anchor
EJBXP	UTILP_ELEC	22	Electrical Junction Box
EJBXX	UTILX_ELEC	3	Electrical Junction Box
ELINEP	UTILP_ELEC	22	Electrical Cable
ELINEX	UTILX_ELEC	3	Power Cable
EMTRP	UTILP_ELEC	22	Electrical Meter
EMTRX	UTILX_ELEC	3	Electric Meter
EPOLEP	UTILP_ELEC	22	Electrical Pole
EPOLEX	UTILX_ELEC	3	Power Pole
ETWRP	UTILP_ELEC	22	Electrical Transmission Tower
ETWRX	UTILX_ELEC	3	Power Transmission Tower
FHYDP	UTILP_WATER	27	Fire Hydrant
FHYDX	UTILX_WATER	8	Fire Hydrant
FOJBXP	UTILP_FIBOPTIC	21	Fiber Optic Junction Box
FOJBXX	UTILX_FIBOPTIC	2	Fiber Optic Junction Box
FOLINP	UTILP_FIBOPTIC	21	Fiber Optic Cable
FOLINX	UTILX_FIBOPTIC	2	Fiber Optic Cable
FOTWRP	UTILP_FIBOPTIC	21	Fiber Optic Transmission Tower
FOTWRX	UTILX_FIBOPTIC	2	Transmission Tower
GLINEP	UTILP_GAS	25	Gas Pipe
GLINEX	UTILX_GAS	6	Gas Pipe
GMTRP	UTILP_GAS	25	Gas Meter
GMTRX	UTILX_GAS	6	Gas Meter
GPMPP	UTILP_GAS	25	Gas Pump
GPMPX	UTILX_GAS	6	Gas Pump
GRSRP	UTILP_GAS	25	Gas Riser
GRSRX	UTILX_GAS	6	Gas Riser
GVLVP	UTILP_GAS	25	Gas Valve
GVLVX	UTILX_GAS	6	Gas Valve
IRLINP	UTILP_IRRIG	29	Irrigation Pipe
IRLINX	UTILX_IRRIG	10	Irrigation Pipe
IRMHLP	UTILP_IRRIG	29	Irrigation Pipe Manhole
IRMHLX	UTILX_IRRIG	10	Irrigation Pipe Manhole
IRMTRP	UTILP_IRRIG	29	Irrigation Meter
IRMTRX	UTILX_IRRIG	10	Irrigation Meter
IRPMPP	UTILP_IRRIG	29	Irrigation Pumps
IRPMPX	UTILX_IRRIG	10	Irrigation Pumps
IRRSRP	UTILP_IRRIG	29	Irrigation Riser
IRRSRX	UTILX_IRRIG	10	Irrigation Riser
IRSIPP	UTILP_IRRIG	29	Irrigation Siphons
IRSIPX	UTILX_IRRIG	10	Irrigation Siphons
IRVLVP	UTILP_IRRIG	29	Irrigation Valves
IRVLVX	UTILX_IRRIG	10	Irrigation Valves
LPOLEP	UTILP_ELEC	22	Luminaire Pole
LPOLEX	UTILX_ELEC	3	Luminaire Pole

OLINEP	UTILP_PETRO	26	Oil Pipe
OLINEX	UTILX_PETRO	7	Oil Pipe
OMTRP	UTILP_PETRO	26	Oil Meter
OMTRX	UTILX_PETRO	7	Oil Meter
ORSRP	UTILP_PETRO	26	Oil Riser
ORSRX	UTILX_PETRO	7	Oil Riser
OVLVP	UTILP_PETRO	26	Oil Valve
OVLVX	UTILX_PETRO	7	Oil Valve
PIPEP	UTILP_PIPE-BELL	23	Pipe with Bell
PIPEP	UTILP_PIPE	24	Pipe
PIPEX	UTILX_PIPE-BELL	4	Pipe with Bell
PIPEX	UTILX_PIPE	5	Pipe without Bell
SNLINP	UTILP_SEWER	28	Sanitary Sewer Pipe
SNLINX	UTILX_SEWER	9	Sanitary Sewer Pipe
SNMHLP	UTILP_SEWER	28	Sanitary Sewer Manhole
SNMHLX	UTILX_SEWER	9	Sanitary Sewer Manhole
SPRNKP	UTILP_IRRIG	29	Sprinkler
SPRNKX	UTILX_IRRIG	10	Sprinkler
TBTHP	UTILP_TELE	20	Telephone Booth
TBTHX	UTILX_TELE	1	Telephone Booth
TGUYP	UTILP_TELE	20	Telephone Pole Anchor
TGUYX	UTILX_TELE	1	Telephone Pole Anchor
TJBXP	UTILP_TELE	20	Telephone Junction Box
TJBXX	UTILX_TELE	1	Telephone Junction Box
TLINEP	UTILP_TELE	20	Telephone Cable
TLINEX	UTILX_TELE	1	Telephone Cable
TPOLEP	UTILP_TELE	20	Telephone Pole
TPOLEX	UTILX_TELE	1	Telephone Pole
TTWRP	UTILP_TELE	20	Telephone Transmission Tower
TTWRX	UTILX_TELE	1	Telephone Transmission Tower
WELLP	UTILP_WATER	27	Well
WELLX	UTILX_WATER	8	Well
WLINEP	UTILP_WATER	27	Water Pipe
WLINEX	UTILX_WATER	8	Water Pipe
WMTRP	UTILP_WATER	27	Water Meter
WMTRX	UTILX_WATER	8	Water Meter
WRSRP	UTILP_WATER	27	Water Riser
WRSRX	UTILX_WATER	8	Water Riser
WVLVP	UTILP_WATER	27	Water Valve
WVLVX	UTILX_WATER	8	Water Valve
WORKZONE TRAFFIC CONTROL			
APLRP	PVMRK_ARROWS	16	Lt. or Rt Turn Arrow
ARDT	WKZN_DIRECIND	48	Direction of Traffic Arrow
ARLDP	PVMRK_ARROWS	16	Lane Reduction Arrow
ARSLRP	PVMRK_ARROWS	16	Comb. Straight Thru & Rt. Or LT. Turn Arrow
ARSTP	PVMRK_ARROWS	16	Straight Thru Arrow
ARTLRP	PVMRK_ARROWS	16	Left and Right Turn Arrow

BARCDE	WKZN_BARRICADE	36	Barricades
CRACUS	WKZN_CUSHION	22	Crash Cushions
DEL1P	PVMRK_DELIN	20	Delineator Type 1
DEL2P	PVMRK_DELIN	20	Delineator Type 2
DEL3P	PVMRK_DELIN	20	Delineator Type 3
DEL4P	PVMRK_DELIN	20	Delineator Type 4
DELP	PVMRK_DELIN	20	Delineator Other Misc. Types
DRUM	WKZN_DRUM	34	Drums
FLAGER	WKZN_FLAGGER	29	Flagger
FWL	WKZN_FLSHLGHT	41	Flashing Warning Lights
ORFLAG	WKZN_ORNGFLAG	42	Orange Flags
PCMS	SIGN_PORT	9	Portable Changeable Message Signs
PILOT	WKZN_PILOTCAR	38	Pilot Car
PRTLIT	WKZN_EQUIP	37	Portable Lighting
PRTSIG	WKZN_PORTSIGNL	40	Portable Traffic Signals
RRSP	PVMRK_RAILRD	15	Railroad Crossing
SIGN1P	SIGN_POST	1	New 1 Post
SIGN1P	SIGN_POST	1	Remove and Reset 1 Post
SIGN1X	SIGN_EXIST	3	Retain and Protect 1 Post
SIGN2P	SIGN_POST	1	New 2 Post
SIGN2P	SIGN_POST	1	Remove and Reset 2 Post
SIGN2X	SIGN_EXIST	4	Retain and Protect 2 Post
TMA	WKZN_ATTNUATR	39	Truck Mounted Attenuators
TRRPM	PVMRK_YELLOW	11	Temporary Ridged Raised Pavement Markers
TUBMAR	WKZN_CHNLDEV	33	Tubular Markers
VRTPAN	WKZN_PANEL	35	Vertical Panels
WVDIR	WKZN_DIRECVEH	49	Direction of Work Vehicles
X-SECTIONS			
ATTENP	RDWY_BARRIER	12	Attenuators
CATBNP	STRUC_PROP	31	Catch Basins
CATBNX	STRUC_EXIST	30	Catch Basins
CULVP	STRUC_PROP	31	Culverts
DMNHLX	STRUC_EXIST	30	Storm Sewer Manholes
EGUYP	UTIL_ELEC	42	Electrical Pole Anchor
EJBXP	UTIL_ELEC	42	Electrical Junction Box
ELINEP	UTIL_ELEC	42	Electrical Cable
EMBNKP	STRUC_PROP	31	Embankment Protectors
EMBNKX	STRUC_EXIST	30	Embankment Protectors
EMTRP	UTIL_ELEC	42	Electrical Meter
EPOLEP	UTIL_ELEC	42	Electrical Pole
ETWRP	UTIL_ELEC	42	Electrical Transmission Tower
FHYDP	UTIL_WATER	47	Fire Hydrant
FL	STRUC_EXIST	30	Pipe Flow Lines
FL	STRUC_PROP	31	Pipe Flow Lines
FOJBXP	UTIL_FIBOPTIC	41	Fiber Optic Junction Box
FOLINP	UTIL_FIBOPTIC	41	Fiber Optic Cable
FOTWRP	UTIL_FIBOPTIC	41	Fiber Optic Transmission Tower

GLINEP	UTIL_GAS	45	Gas Pipe
GRSRP	UTIL_GAS	45	Gas Riser
GVLVP	UTIL_GAS	45	Gas Valve
IRLINP	UTIL_IRRIG	49	Irrigation Pipe
IRMHLP	UTIL_IRRIG	49	Irrigation Manhole
IRPMPP	UTIL_IRRIG	49	Irrigation Pumps
IRRSRP	UTIL_IRRIG	49	Irrigation Risers
IRSIPP	UTIL_IRRIG	49	Irrigation Siphon
IRVLVP	UTIL_IRRIG	49	Irrigation Valves
LPOLEP	UTIL_ELEC	42	Luminaire Pole
MBARP	RDWY_BARRIER	12	Median Barriers
OLINEP	UTIL_PETRO	46	Oil Pipe
ORSRP	UTIL_PETRO	46	Oil Riser
OVLVP	UTIL_PETRO	46	Oil Valve
PIPEB	STRUC_EXIST	30	Culverts
PIPEP	UTIL_PIPEBELL	43	Pipe with Directional Bell
PIPEP	UTIL_PIPE	44	Pipe
RIPRAP	STRUC_EXIST	30	Riprap
RIPRAP	STRUC_PROP	31	Riprap
SNLINP	UTIL_SEWER	48	Sanitary Sewer Pipe
SNMHLP	UTIL_SEWER	48	Sanitary Sewer Manhole
SSLINE	STRUC_EXIST	30	Storm Sewer Lines
SSLINP	STRUC_PROP	31	Storm Sewer Lines
SSMHLP	STRUC_PROP	31	Storm Sewer Manholes
TGUYP	UTIL_TELE	40	Telephone Pole Anchor
TJBXP	UTIL_TELE	40	Telephone Junction Box
TLINEP	UTIL_TELE	40	Telephone Cable
TPOLEP	UTIL_TELE	40	Telephone Pole
TTWRP	UTIL_TELE	40	Telephone Transmission Tower
WELLP	UTIL_WATER	47	Well
WLINEP	UTIL_WATER	47	Water Pipe
WMTRP	UTIL_WATER	47	Water Meter
WRSRP	UTIL_WATER	47	Water Riser
WVLVP	UTIL_WATER	47	Water Valve

1.15.4 Cells and Layer Collections

NetSPEX has the ability to assign cells to layer collections, which enables a graphic cell to be placed on various levels within a design file. When a symbol component assigned to a layer collection is selected from the NetSPEX Designer interface, a dialog box displays in which the user can select the desired placement level for the cell. The cell assumes the color, style, and weight symbology for the selected level. When a group of cells are identical in terms of their graphic dimensions and appearance, but differ only in their color, style, weight, and level assignment, this feature allows a CADD manager to consolidate them into a single cell definition.

ITD does not currently have plans to use layer collections. This decision was made in order to maintain unique definitions for each cell, which will allow users the alternative to select and place cells from the MicroStation Cell Library dialog box rather than being forced, in all cases, to rely upon NetSPEX Designer as the only interface for cell placement.

1.15.5 Cell Library Organization

Cells will be organized into discipline-specific cell libraries. This is being done to provide more logical symbol organization and to improve accessibility for the user.

1.15.6 Cell Sizing

During the creation of the new discipline-specific cell libraries, cells were examined for proper sizing and scale. All cells will be checked again for proper sizing during the creation of MicroStation resources and the development of the NetSPEX CADD standards database (Tasks 4 and 5).

1.15.7 Cell Library Storage Location

Discipline-specific cell libraries will be stored in the CADD resource directory structure in the folder locations shown in the table below.

Discipline or Category	Design File Storage Location
Bridge	CADD_Standards\Bentley\MicroStation\Bridge\Cell_Libraries
Construction	CADD_Standards\Bentley\MicroStation\Construction\Cell_Libraries
Environmental	CADD_Standards\Bentley\MicroStation\Environmental\Cell_Libraries
General	CADD_Standards\Bentley\MicroStation\General\Cell_Libraries
GIS	CADD_Standards\Bentley\MicroStation\GIS\Cell_Libraries
Hydraulics	CADD_Standards\Bentley\MicroStation\Hydraulics\Cell_Libraries
Landscape	CADD_Standards\Bentley\MicroStation\Landscape\Cell_Libraries
Location	CADD_Standards\Bentley\MicroStation\Location\Cell_Libraries
Materials	CADD_Standards\Bentley\MicroStation\Materials\Cell_Libraries
Minor Structures	CADD_Standards\Bentley\MicroStation\Minor_Structures\Cell_Libraries
Right-of-Way	CADD_Standards\Bentley\MicroStation\Right_of_Way\Cell_Libraries
Roadway	CADD_Standards\Bentley\MicroStation\Roadway\Cell_Libraries
Traffic	CADD_Standards\Bentley\MicroStation\Traffic\Cell_Libraries
Utilities	CADD_Standards\Bentley\MicroStation\Utilities\Cell_Libraries
Visualization	CADD_Standards\Bentley\MicroStation\Visualization\Cell_Libraries

1.16.1 Standard Drawing Scales

NetSPEX will store all drawing scales that will be necessary for plan production in the CADD standards database. When a design file is branded through NetSPEX, an active drawing scale is assigned. Certain NetSPEX components, such as symbol, annotation, and dimension components, can be sized automatically during placement by a factor that is based on the active drawing scale.

The standard scales for the Roadway Design and Bridge Sections are shown in the table below.

Standards Drawing Scales
Roadway Design Section
1”=10’
1”=20’
1”=40’
1”=50’
1”=100’
1”=200’
1”=400’
1”=500’
1”=1000’
1”=2000’
Bridge Section
1”=5’
1”=10’
1”=20’
1”=30’
1”=40’
1”=50’
1”=60’
1”=100’
3/32”=1’
1/8”=1’
3/16”=1’
1/4”=1’
3/8”=1’
1/2”=1’
3/4”=1’
1”=1’
1 1/2”=1’
3”=1’

1.16.2 Drawings with Multiple Scale Requirements

NetSPEX maintains an active scale with branded drawings. This setting can be changed at any time through the NetSPEX Designer interface and can be saved with the design file for use in future editing sessions or set temporarily for use during the current editing session only. For the most part, drawings will be assigned a single, permanent scale. However, to allow the creation of drawings that may require multiple drawing scales on the same sheet, temporary scale branding may be employed. The Detail sheet type is the only anticipated drawing type that will be affected by this requirement.

1.17.1 Custom Line Styles

The new CADD standards will make extensive use of custom line styles. The custom line styles that will be assigned to each drawing type have been identified in the drawing type spreadsheets.

ProSoft has examined existing Metric standard custom line styles to determine whether or not they can be adapted for use in AutoCAD. Many convert readily to AutoCAD using the MicroStation V8 translation utilities and could potentially be stored in the AutoCAD template files that are supplied to consultants and contractors, if the decision is made to support this platform in the future. However, without an AutoCAD .LIN line type definition file, consultants and contractors will not be able to load or reload the custom line styles in an AutoCAD drawing file or view line style previews in the AutoCAD interface. ProSoft recommends that ITD consider creating an AutoCAD line type definition file with all of the standard line type definitions. Most of the symbols that are embedded in the custom line styles can be created as AutoCAD shape files. However, the length of the symbol or pattern will have an effect on the appearance of the line style when it is used on arcs or curves. This will make it more difficult in some instances to directly match the appearance of certain MicroStation custom line styles in AutoCAD.

It should also be noted that AutoCAD does not provide support for multiple parallel segments in its custom line style definitions. This limitation will make it necessary to use substitute line styles in AutoCAD for any custom line styles that contain parallel segments.

1.17.2 Custom Line Style Level Assignments

The levels on which components with custom line styles will be placed have been identified in the drawing type spreadsheets. The table below contains a summary of these line styles.

Note: This table includes the names of custom line styles that have been defined at the time of the completion of this report. Other custom line styles will likely be added as additional drawing types are completed.

LINE STYLE	LEVEL NAME	NUMBER	DESCRIPTION
DESIGN			
AttenuatorProp	RDWY_BARRIER	12	Attenuators
ChannelChange	SURF_DITCH	26	Top of Ditch
ChannelChange	SURF_DITCH	26	Backslope of Ditch
ChannelChange	SURF_CHNLCHG	29	Channel Change
Curb&GutterProp	RDWY_CURB	10	Curb & Gutter

CurbProp	RDWY_CURB	10	Curb
CutSlope	SURF_FINGRD	23	Cut Slope
EdgeOil	RDWY_EDGERD	11	Edge of Oil
EdgePavedRoad	RDWY_EDGERD	11	Edge of Paved Road
EdgeUnpavedRoad	RDWY_EDGERD	11	Edge of Unpaved Road
EO	SURF_FINGRD	23	Left Edge of Oil
FenceProp	SURF_FENCE	24	Fences
FillSlope	SURF_FINGRD	23	Fill Slope
FlowLineGutter	RDWY_CURB	10	Flow Line of Gutter
GuardrailConProp	RDWY_BARRIER	12	Concrete Guardrail
GuardrailMetalProp	RDWY_BARRIER	12	Metal Guardrail
GutterProp	RDWY_CURB	10	Gutter
LipGutter	RDWY_CURB	10	Lip of Gutter
MedianBarrierProp	RDWY_BARRIER	12	Median Barriers
NoiseWallsProp	STRC_NOISEWALL	33	Noise Walls
Railroad1TrackProp	STRC_RAIL	36	Railroad 1 Track
Railroad2TracksProp	STRC_RAIL	36	Railroad 2 Track
RetainingWallProp	STRC_RETWALL	32	Retaining Walls
RoadClosure	RDWY_CLOSURE	17	Road Closure
SnowFenceProp	SURF_FENCE	24	Snow Fence
TopBackCurb	RDWY_CURB	10	Top Back of Curb
TopFaceCurb	RDWY_CURB	10	Top Face of Curb
WaterExist	SURF_DITCH	26	Ditch Bottom
HYDRO			
ChannelChange	SURF_DITCH	26	Top of Ditch
ChannelChange	SURF_WATER	29	Channel Change
DitchF/L	SURF_DITCH	26	Flow Line of Ditch
DitchProp	SURF_DITCH	26	Ditches
Headwall	STRUC_HYDRAUL	30	Headwalls
PipeCulvertProp	STRUC_HYDRAUL	30	Pipe Culverts
PipeStormSewerProp	STRUC_HYDRAUL	30	Storm Sewer Lines
PipeUnderdrainProp	STRUC_HYDRAUL	30	Underdrains
Riprap	STRUC_HYDRAUL	30	Riprap
Siphon	STRUC_HYDRAUL	30	Siphons
SpecialDitchProp	SURF_DITCH	26	Special Ditches
WaterExist	SURF_DITCH	26	Bottom of Ditch
ChannelChange	SURF_SPDITCH	26	Special Ditch Grade
EGuyWire	UTIL_ELEC	42	Electrical Pole Anchor
ElectricalCable	UTIL_ELEC	42	Electrical Cable
FiberOpticCable	UTIL_FIBOPTIC	41	Fiber Optic Cable
PipeBellProp	UTIL_PIPEBELL	43	Pipe with Directional Bell
PipeCulvertProp	STRC_PIPE	30	Pipe Culvert
PipeCulvertProp	STRC_PIPE	30	Pipe Arch
PipeCulvertProp	STRC_PIPE	30	Pipe Siphon
PipeGasProp	UTIL_GAS	45	Gas Pipe
PipeIrrProp	UTIL_IRRIG	49	Irrigation Pipe
PipeOilProp	UTIL_PETRO	46	Oil Pipe

PipeProp	UTIL_PIPE	44	Pipe
PipeSanSewerProp	UTIL_SEWER	48	Sanitary Sewer Pipe
PipeWaterProp	UTIL_WATER	47	Water Pipe
SiphonIrrProp	UTIL_IRRIG	49	Irrigation Siphons
TelephoneCable	UTIL_TELE	40	Telephone Cable
TGuyWire	UTIL_TELE	40	Telephone Pole Anchor
RIGHT-OF-WAY			
1/16Line	BNDYX_SECLINE	2	1/16 Section Lines
1/16Line	BNDYP_SECLINE	24	1/16 Lines
CityLimits	BNDYX_POLLINE	5	City Limits Boundary Lines
CityLimits	BNDYP_POLLINE	27	City Limits Boundary Lines
CountyLine	BNDYX_POLLINE	5	County Boundary Lines
CountyLine	BNDYP_POLLINE	27	County Boundary Lines
EasementExist	ROWX_ESMNTLINE	17	Existing Easement Line
EasementExistFence	ROWX_ESMNTLINE	17	Existing Easement Line with Fence
EasementPermExist	ROWX_ESMNTLINE	17	Existing Permanent Easement Line
EasementPermExistFence	ROWX_ESMNTLINE	17	Existing Perm. Easement Line w/ Fence
EasementPermProp	ROWP_ESMNTLINE	39	Proposed Permanent Easement Line
EasementPermPropFence	ROWP_ESMNTLINE	39	Proposed Perm. Easement Line with Fence
EasementProp	ROWP_ESMNTLINE	39	Proposed Easement Line
EasementPropFence	ROWP_ESMNTLINE	39	Proposed Easement Line with Fence
EasementTempExist	ROWX_ESMNTLINE	17	Existing Temporary Easement Line
EasementTempExistFence	ROWX_ESMNTLINE	17	Existing Temp. Easement Line with Fence
EasementTempProp	ROWP_ESMNTLINE	39	Proposed Temporary Easement Line
EasementTempPropFence	ROWP_ESMNTLINE	39	Proposed Temp. Easement Line w/ Fence
ForrestBoundary	BNDYX_POLLINE	5	Forrest Boundary Lines
ForrestBoundary	BNDYP_POLLINE	27	Forrest Boundary Lines
IndianBoundary	BNDYX_POLLINE	5	Indian Boundary Lines
IndianBoundary	BNDYP_POLLINE	27	Indian Boundary Lines
P/L	ROWP_PROPLINE	33	Property, Subdivision, Lot, Block Lines
P/LExist	ROWX_PROPLINE	11	Property, Subdivision, Lot, Block Lines
P/LExistFence	ROWX_PROPLINE	11	Property Line with Existing Fence
P/LExistFence	ROWP_PROPLINE	33	Property Line with Existing Fence
QuarterLine	BNDYX_SECLINE	2	Quarter Section Lines
QuarterLine	BNDYP_SECLINE	24	Quarter Section Lines
R/WExist	ROWX_LINE	14	Existing R/W
R/WExistFence	ROWX_LINE	14	Existing R/W with Fence
R/WFullExist	ROWX_LINE	14	Existing Full Access
R/WFullExistFence	ROWX_LINE	14	Existing Full Access with Fence
R/WFullProp	ROWP_LINE	36	Proposed Full Access
R/WFullPropFence	ROWP_LINE	36	Proposed Full Access with Fence
R/WParAccExist	ROWX_LINE	14	Existing Partial Access
R/WParAccExistFence	ROWX_LINE	14	Existing Partial Access with Fence
R/WParAccProp	ROWP_LINE	36	Proposed Partial Access
R/WParAccPropFence	ROWP_LINE	36	Proposed Partial Access with Fence
R/WProp	ROWP_LINE	36	Proposed R/W
R/WPropFence	ROWP_LINE	36	Proposed R/W with Fence

R/WRR	ROWX_LINE	14	Existing Railroad R/W
R/WRR	ROWP_LINE	36	Proposed Railroad R/W
R/WRRFence	ROWX_LINE	14	Existing Railroad R/W with Fence
R/WRRFence	ROWP_LINE	36	Proposed Railroad R/W with Fence
R/WT1AccExist	ROWX_LINE	14	Existing Partial Access Type 1
R/WT1AccExistFence	ROWX_LINE	14	Existing Partial Access Type 1 with Fence
R/WT1AccProp	ROWP_LINE	36	Proposed Partial Access Type 1
R/WT1AccPropFence	ROWP_LINE	36	Proposed Partial Access Type 1 w/ Fence
R/WT2AccExist	ROWX_LINE	14	Existing Partial Access Type 2
R/WT2AccExistFence	ROWX_LINE	14	Existing Partial Access Type 2 with Fence
R/WT2AccProp	ROWP_LINE	36	Proposed Partial Access Type 2
R/WT2AccPropFence	ROWP_LINE	36	Proposed Partial Access Type 2 w/ Fence
R/WT3AccExist	ROWX_LINE	14	Existing Partial Access Type 3
R/WT3AccExistFence	ROWX_LINE	14	Existing Partial Access Type 3 w/ Fence
R/WT3AccProp	ROWP_LINE	36	Proposed Partial Access Type 3
R/WT3AccPropFence	ROWP_LINE	36	Proposed Partial Access Type 3 w/ Fence
R/WT4AccExist	ROWX_LINE	14	Existing Partial Access Type 4
R/WT4AccExistFence	ROWX_LINE	14	Existing Partial Access Type 4 w/ Fence
R/WT4AccProp	ROWP_LINE	36	Proposed Partial Access Type 4
R/WT4AccPropFence	ROWP_LINE	36	Proposed Partial Access Type 4 w/ Fence
StateLine	BNDYX_POLLINE	5	State Boundary Lines
StateLine	BNDYP_POLLINE	27	State Boundary Lines
Township/Range	BNDYX_SECLINE	2	Township & Range Lines
Township/Range	BNDYP_SECLINE	24	Township & Range Lines
TOPOGRAPHY			
BreakLine	SURF_BRKLN	22	DTM Breakline
BushBoundary	SURF_VEG	28	Bush Boundary
ChannelChange	SURF_DITCH	26	Top of Ditch
ChannelChange	SURF_WATRFTR	29	Top of Bank
ContourIndex	SURF_IDXCONT	20	Index Contours
ContourIndexDepr	SURF_IDXCONT	20	Depression Index Contours
ContourIndexHidDepr	SURF_IDXCONT	20	Hidden Depression Index Contours
ContourInterHid	SURF_INTCONT	21	Hidden Intermediate Contours
ContourInterHidDepr	SURF_INTCONT	21	Hidden Depression Intermediate Contours
ControlLine	RDWY_HORALIGN	14	Control Line
CultivationBoundary	SURF_VEG	28	Cultivation Boundary
Curb&GutterExist	RDWY_CURB	10	Curb & Gutter
CurbExist	RDWY_CURB	10	Curb
CutSlope	SURF_BRKLN	22	Cut Slope
DitchF/L	SURF_DITCH	26	Flow Line of Ditch
EO	RDWY_EDGERD	11	Edge of Oil
EO	RDWY_APPRCH	15	Paved Rural Approaches
EO	RDWY_APPRCH	15	Urban Approaches
EO	RDWY_APPRCH	15	Parking Lots
FenceExist	SURF_FENCE	24	Fences
FillSlope	SURF_BRKLN	22	Fill Slope
FlatConcrete	RDWY_SDWLK	16	Back of Sidewalk

FlatConcrete	RDWY_SDWLK	16	Misc. Flat Concrete
GuardrailConExist	RDWY_BARRIER	12	Guardrail Concrete Existing
GuardrailMetalExist	RDWY_BARRIER	12	Guardrail Metal Existing
GutterExist	RDWY_CURB	10	Gutter
Headwall	STRC_HYDRO	30	Headwalls
LaneLine	RDWY_PAINT	17	Lane Lines
MarshBoundary	SURF_WATRFTR	29	Marshland Boundary
MarshBoundary	SURF_WATRFTR	29	Marshland
NoiseWallsExist	STRC_NOISEWALL	33	Noise Walls
Path	SURF_TRAIL	25	Paths
PipeBellExist	STRC_HYDRO	30	Pipe Culverts
PipeBellExist	STRC_HYDRO	30	Siphons
PipeStormSewerExist	STRC_HYDRO	30	Storm Sewer Lines
PipeUnderdrainExist	STRC_HYDRO	30	Underdrains
Railroad1TrackExist	STRC_RAIL	36	Railroad 1 Track
Railroad2TracksExist	STRC_RAIL	36	Railroad 2 Track
RetainingWallExist	STRC_RETWALL	32	Retaining Walls
Riprap	STRC_HYDRO	30	Riprap
Shoulder	RDWY_EDGERD	11	Shoulder of Road
Shoulder	RDWY_APPRCH	15	Unpaved Rural Approaches
Sidewalk	RDWY_SDWLK	16	Sidewalks
SnowFenceExist	SURF_FENCE	24	Snow Fence
SpecialPaveMark	RDWY_PAINT	17	Special Pavement Markings
SurveyedC/L	RDWY_HORALIGN	14	Surveyed Center Line
ToeSlope	SURF_BRKLN	22	Toe of Slope
Trail	SURF_TRAIL	25	Trails
TreeBoundary	SURF_VEG	28	Tree Boundary
WaterExist	SURF_DITCH	26	Bottom of Ditch
WaterExist	SURF_DITCH	26	Field Irrigation
WaterExist	SURF_WATRFTR	29	River
WaterExist	SURF_WATRFTR	29	Channels
WaterExist	SURF_WATRFTR	29	Canals
WaterExist	SURF_WATRFTR	29	Creeks
WaterExist	SURF_WATRFTR	29	Lakes
WaterExist	SURF_WATRFTR	29	Reservoirs
WaterExist	SURF_WATRFTR	29	Ponds
WetlandBoundary	SURF_WATRFTR	29	Wetland Boundary
WetlandBoundary	SURF_WATRFTR	29	Wetland
TYPICALS			
AttenuatorProp	RDWY_BARRIER	12	Attenuators
ChannelChange	SURF_DITCH	26	Top of Ditch
ChannelChange	SURF_DITCH	26	Back Slope of Ditch
Curb&GutterProp	RDWY_CURB	10	Curb & Gutter
CurbProp	RDWY_CURB	10	Curb
CutSlope	SURF_FINGRD	23	Cut Slope
EdgeOil	RDWY_EDGERD	11	Edge of Oil
EdgePavedRoad	RDWY_EDGERD	11	Edge of Paved Road

EdgeUnpavedRoad	RDWY_EDGERD	11	Edge of Unpaved Road
EGuyWire	UTIL_ELEC	42	Electrical Pole Anchor
ElectricalCable	UTIL_ELEC	42	Electrical Cable
FiberOpticCable	UTIL_FIBOPTIC	41	Fiber Optic Cable
FillSlope	SURF_FINGRD	23	Fill Slope
FlowLineGutter	RDWY_CURB	10	Flow Line of Gutter
GuardrailConProp	RDWY_BARRIER	12	Concrete Guardrail
GuardrailMetalProp	RDWY_BARRIER	12	Metal Guardrail
GutterProp	RDWY_CURB	10	Gutter
Headwall	STRUC_EXIST	30	Headwalls
Headwall	STRUC_PROP	31	Headwalls
LipGutter	RDWY_CURB	10	Lip of Gutter
MedianBarrierProp	RDWY_BARRIER	12	Median Barriers
NoiseWallsProp	STRUC_NOISEWALL	33	Noise Walls
PipeBellExist	STRUC_EXIST	30	Culverts
PipeBellProp	UTIL_PIPEBELL	43	Pipe with Directional Bell
PipeCulvertProp	STRUC_PROP	31	Culverts
PipeGasProp	UTIL_GAS	45	Gas Pipe
PipeIrrProp	UTIL_IRRIG	49	Irrigation Pipe
PipeOilProp	UTIL_PETRO	46	Oil Pipe
PipeProp	UTIL_PIPE	44	Pipe
PipeSanSewerProp	UTIL_SEWER	48	Sanitary Sewer Pipe
PipeStormSewerExist	STRUC_EXIST	30	Storm Sewer Lines
PipeStormSewerProp	STRUC_PROP	31	Storm Sewer Lines
PipeWaterProp	UTIL_WATER	47	Water Pipe
RetainingWallProp	STRUC_RETWALL	32	Retaining Walls
Riprap	STRUC_EXIST	30	Riprap
Riprap	STRUC_PROP	31	Riprap
SiphonIrrProp	UTIL_IRRIG	49	Irrigation Siphon
TelephoneCable	UTIL_TELE	40	Telephone Cable
TGuyWire	UTIL_TELE	40	Telephone Pole Anchor
TopBackCurb	RDWY_CURB	10	Top Back of Curb
TopFaceCurb	RDWY_CURB	10	Top Face of Curb
WaterExist	SURF_DITCH	26	Flow Line of Ditch
UTILITIES			
ElectGuyWireExist	UTILX_ELEC	3	Power Pole Anchor
ElectGuyWireProp	UTILP_ELEC	22	Electrical Pole Anchor
ElectricalCableExist	UTILX_ELEC	3	Power Cable
ElectricalCableProp	UTILP_ELEC	22	Electrical Cable
FiberOpticCableExist	UTILX_FIBOPTIC	2	Fiber Optic Cable
FiberOpticCableProp	UTILP_FIBOPTIC	21	Fiber Optic Cable
GasPipeExist	UTILX_GAS	6	Gas Pipe
GasPipeProp	UTILP_GAS	25	Gas Pipe
IrrigationPipeExist	UTILX_IRRIG	10	Irrigation Pipe
IrrigationPipeProp	UTILP_IRRIG	29	Irrigation Pipe
IrrigationSiphonExist	UTILX_IRRIG	10	Irrigation Siphons
IrrigationSiphonProp	UTILP_IRRIG	29	Irrigation Siphons

OilPipeExist	UTILX_PETRO	7	Oil Pipe
OilPipeProp	UTILP_PETRO	26	Oil Pipe
PipeBellExist	UTILX_PIPE-BELL	4	Pipe with Bell
PipeBellProp	UTILP_PIPE-BELL	23	Pipe with Bell
PipeExist	UTILX_PIPE	5	Pipe without Bell
PipeProp	UTILP_PIPE	24	Pipe
SanSewerPipeExist	UTILX_SEWER	9	Sanitary Sewer Pipe
SanSewerPipeProp	UTILP_SEWER	28	Sanitary Sewer Pipe
TelephoneCableExist	UTILX_TELE	1	Telephone Cable
TelephoneCableProp	UTILP_TELE	20	Telephone Cable
TelGuyWireExist	UTILX_TELE	1	Telephone Pole Anchor
TelGuyWireProp	UTILP_TELE	20	Telephone Pole Anchor
WaterPipeExist	UTILX_WATER	8	Water Pipe
WaterPipeProp	UTILP_WATER	27	Water Pipe
WORKZONE TRAFFIC CONTROL			
12X38SkipWhite	PVMRK_WHITE	10	12'x38' Skip
12X38SkipYellow	PVMRK_YELLOW	11	12'x38' Skip
24Bar	PVMRK_YELLOW	11	24" Bar
2X4X4DashWhite	PVMRK_WHITE	10	2'x4'x4" Dash
2X4X4DashYellow	PVMRK_YELLOW	11	2'x4'x4" Dash
2X4X8DashWhite	PVMRK_WHITE	10	2'x4'x8" Dash
8X17SkipWhite	PVMRK_WHITE	10	8'x17' Skip
8X17SkipYellow	PVMRK_YELLOW	11	8'x17' Skip
Barricade	WKZN_BARRICADE	36	Barricades
conrail	WKZN_BARRIER	21	Temporary Barriers
Crosswalk	PVMRK_CROSSWK	13	Crosswalk
CrosswalkCrossBar	PVMRK_CROSSBAR	14	Crosswalk Cross Bar
Drums	WKZN_DRUM	34	Drums
Metal	WKZN_BARRIER	21	Metal
NoPassing	PVMRK_YELLOW	11	No Passing
StopBar	PVMRK_STOPBAR	12	Stop Bar
TubularMarkers	WKZN_CHNLDEV	33	Tubular Markers
X-SECTIONS			
AttenuatorProp	RDWY_BARRIER	12	Attenuators
ChannelChange	SURF_DITCH	26	Top of Ditch
ChannelChange	SURF_DITCH	26	Back Slope of Ditch
Curb&GutterProp	RDWY_CURB	10	Curb & Gutter
CurbProp	RDWY_CURB	10	Curb
CutSlope	SURF_FINGRD	23	Cut Slope
EdgeOil	RDWY_EDGERD	11	Edge of Oil
EdgePavedRoad	RDWY_EDGERD	11	Edge of Paved Road
EdgeUnpavedRoad	RDWY_EDGERD	11	Edge of Unpaved Road
EGuyWire	UTIL_ELEC	42	Electrical Pole Anchor
ElectricalCable	UTIL_ELEC	42	Electrical Cable
FiberOpticCable	UTIL_FIBOPTIC	41	Fiber Optic Cable
FillSlope	SURF_FINGRD	23	Fill Slope
FlowLineGutter	RDWY_CURB	10	Flow Line of Gutter

GuardrailConProp	RDWY_BARRIER	12	Concrete Guardrail
GuardrailMetalProp	RDWY_BARRIER	12	Metal Guardrail
GutterProp	RDWY_CURB	10	Gutter
Headwall	STRUC_EXIST	30	Headwalls
Headwall	STRUC_PROP	31	Headwalls
LipGutter	RDWY_CURB	10	Lip of Gutter
MedianBarrierProp	RDWY_BARRIER	12	Median Barriers
NoiseWallsProp	STRUC_NOISEWALL	33	Noise Walls
PipeBellExist	STRUC_EXIST	30	Culverts
PipeBellProp	UTIL_PIPEBELL	43	Pipe with Directional Bell
PipeCulvertProp	STRUC_PROP	31	Culverts
PipeGasProp	UTIL_GAS	45	Gas Pipe
PipeIrrProp	UTIL_IRRIG	49	Irrigation Pipe
PipeOilProp	UTIL_PETRO	46	Oil Pipe
PipeProp	UTIL_PIPE	44	Pipe
PipeSanSewerProp	UTIL_SEWER	48	Sanitary Sewer Pipe
PipeStormSewerExist	STRUC_EXIST	30	Storm Sewer Lines
PipeStormSewerProp	STRUC_PROP	31	Storm Sewer Lines
PipeWaterProp	UTIL_WATER	47	Water Pipe
RetainingWallProp	STRUC_RETWALL	32	Retaining Walls
Riprap	STRUC_EXIST	30	Riprap
Riprap	STRUC_PROP	31	Riprap
SiphonIrrProp	UTIL_IRRIG	49	Irrigation Siphon
TelephoneCable	UTIL_TELE	40	Telephone Cable
TGuyWire	UTIL_TELE	40	Telephone Pole Anchor
TopBackCurb	RDWY_CURB	10	Top Back of Curb
TopFaceCurb	RDWY_CURB	10	Top Face of Curb
WaterExist	SURF_DITCH	26	Flow Line of Ditch

1.17.3 Custom Line Styles to Create

The custom line styles that will be included in the standard CADD resources have been identified and their names have been included in the drawing type spreadsheets. Several discipline groups have requested additional custom line styles. The list of new custom line styles to be included is still not definitive. However, as these styles are identified, they can be added to the ITD line style resource file and NetSPEX database when needed.

1.18.1 ITD Color Table

While the current color table has been modified from the default MicroStation colors, there is really no need to customize this table further, unless ITD would like to make more substantial changes at this time. One potential change that was proposed and discussed during the standards review meetings was whether or not it would make sense to use Web-compatible RGB values in the color table to increase compatibility with Web document formats, such as Adobe .PDF.

ProSoft recommends that the default colors be used as much as possible during the initial rollout of the standard. If subsequent changes become necessary, this can be

addressed at a later time. The storage location for color tables is pointed to by the workspace configuration, which means that additional color tables can be made available later if necessary.

1.18.2 IPLOT Color Needs

While some minor set up will be required for IPLOT concurrent with the implementation of the new CADD standards, there are no specific color table changes that should be addressed during the transition.

1.19.1 Standard Details to be Included in NetSPEX

Standard details can be delivered through the NetSPEX Designer interface. Details are stored as design files rather than cell libraries.

ProSoft recommends that this feature be used for the placement of complex symbols, portions of standard drawings or anything that could be considered a detail drawing that could potentially be inserted into a sheet. The compilation of these details may take significant time to complete. In the interest of implementing the CADD standards in as timely a manner as possible, ProSoft recommends implementing only those details that are considered critical to production at this time. Other details can be prepared and added in later phases.

1.19.2 Drawing Types for Detail Placement

In general, details will be placed in the detail drawing type for each discipline. However, it is possible that for some of the traffic drawings, such as the Signal Plan, Illumination Plan, Workzone Traffic Control Plan, and Signing and Pavement Marking Plan, details may be substituted for symbols due to the complexity of the components and the probable need to alter their dimensions or appearance immediately after placement.

1.19.3 Detail Level Assignments

New level structures have been created for the detail drawing type. This drawing type will be used by several design disciplines. Prior to implementation in the workspace and NetSPEX Designer interface, it will be necessary to review the detail design files to test for compliance with the approved detail level structure. Depending on the number of details, the potential exists for this to be a rather time intensive task. With this in mind, ProSoft would recommend that only the most critical details be prepared for the initial implementation with the new CADD standards tools. Other details can be added to NetSPEX on an individual basis when they are completed.

1.20.1 User Interface Customization

NetSPEX will manage the delivery of CADD resources and the creation of custom pull-down menus, if they are implemented. For this reason, minimal individual user interface customization will be employed with the initial release of the new workspace and CADD standards.

While some scattered user interface customization may exist, the only significant component that will likely be employed is the custom menu that is used with digitizing tablets in the Bridge Section. If employed, this menu must be analyzed for compliance with the new CADD standards.

The workspace configuration is being designed in such a way as to allow individual customization, such as toolboxes and menus, to be employed at any time. If at a later time certain users develop MicroStation interface customization that they would like to use in production, these components can be placed in their individual user folders so they can be accessed through the workspace.

1.20.2 Additional User Interface Customization to be Included in the Workspace

Other than the Bridge tablet menu, there are no known user interface components that are considered critical to the design workflow.

1.21.1 Standard Function Key Menu Naming Conventions

During the implementation of the new CADD standards and workspace configuration, a standard function key menu will be deployed to provide quick access to commonly used commands and settings. The workspace configuration will also accommodate the use of individual, user-specific function key menus. The Bridge Section has its own unique function key menu.

The standard function key menu will be named using the convention shown below:

itd_fkey.mnu

If function key menus for individual users are eventually implemented, the naming convention will include the user's login name and the letters "fkey", as shown below:

<username>_fkey.mnu

The function key menu for the Bridge Section will be named as follows:

bridge_fkey.mnu

1.21.2 Determine Standard Function Key Menu Assignments

ProSoft has reviewed several of the function key menus that were provided by a representative cross section of ITD CADD users. Based on this evaluation, it would appear that function key menus are used most commonly at ITD for the following purposes:

- Load applications
- Load dialog boxes
- Set 2D and 3D viewing parameters
- Load cell libraries
- Activate measuring commands
- Activate drawing commands
- Perform basic drawing functions, such as undo and redo
- Enable or disable locks
- Perform file-related operations, such as compress, backup, and save settings

The Bridge Section also uses its function key menu to establish drawing properties and text settings. This could present some obstacles to standards compliance if the command strings that are used with these function key assignments are not set up in accordance with approved CADD standards. To address this potential problem, ProSoft suggests that a NetSPEX key-in be used in place of the command strings that are currently in use. This would activate a NetSPEX component directly from the CADD standards database without having to display the NetSPEX Designer interface. If in the future the symbology or text style settings for the component change, the user would not have to update the settings in the command string to correspond to this change.

The suggested function key assignments for the standard ITD function key menu are shown in the table below:

	Key	Assignment	Description
Drawing Assist Tools	F1	undo	Activates Undo command
	F2	redo	Activates Redo command
	F3	lock axis toggle	Enables/disables Axis Lock
	F4	lock ggroup toggle	Enables/disables Graphic Group Lock
	F5	lock fence inside	Enables Inside fence mode
	F6	lock fence overlap	Enables Overlap fence mode
	F7	lock snap nearest	Enables Nearest snap mode
	F8	lock snap midpoint	Enables Midpoint snap mode
	F9	lock snap intersection 1	Enables Intersection snap mode
	F10	lock snap keypoint	Enables Keypoint snap mode
	F11	<open>	Open for additional assignment
	F12	<open>	Open for additional assignment
View and Display Settings	Alt+F1	update view	Updates a selected view
	Alt+F2	update all	Updates all views
	Alt+F3*	fit all;selview 1	Fits all elements in View 1
	Alt+F4*	fit active;selview 1	Fits active design elements in View 1
	Alt+F5*	fit reference;selview 1	Fits reference elements in View 1
	Alt+F6*	view previous;selview 1	Restores previous view in View 1
	Alt+F7*	on=1-63;selview 1	Displays all levels in View 1
	Alt+F8*	of=1-63;selview 1	Turns all levels off in View 1
	Alt+F9	ref dis on	Turns reference display on
	Alt+F10	ref dis off	Turns reference display off
	Alt+F11	dp=-100000,100000	Sets Display Depth to –100000,100000
	Alt+F12	az=0	Sets Active Depth to 0
Input/Measuring/File Tools	Ctrl+F1	k,aa=	Enters aa= in the Key-in Window
	Ctrl+F2	k,az=	Enters az= in the Key-in Window
	Ctrl+F3	k,di=	Enters di= in the Key-in Window
	Ctrl+F4	k,dl=	Enters dl= in the Key-in Window
	Ctrl+F5	measure distance points	Activates Measure Distance (Points mode)
	Ctrl+F6	measure distance perpendicular	Activates Measure Distance (Perp. mode)
	Ctrl+F7	measure radius	Activates Measure Radius
	Ctrl+F8	measure angle	Activates Measure Angle
	Ctrl+F9	measure area flood	Activates Measure Area (Flood mode)
	Ctrl+F10	backup	Initiates Backup command
	Ctrl+F11	file design	Initiates Save Settings command
	Ctrl+F12	compress	Initiates Compress command
Applications/Dialog Boxes	Shift+F1	netspex designer launch;	Launches NetSPEX Designer
	Shift +F2	mdl l inroads	Launches InRoads
	Shift +F3	mdl l irasb	Launches I/RAS B
	Shift +F4	iplot	Launches Iplot
	Shift +F5	dialog text settings	Displays the Text Settings dialog box
	Shift +F6	dialog reference	Displays the Reference Files dialog box
	Shift +F7	dialog view settings	Displays the View Attributes dialog box
	Shift +F8	mdl keyin lvlmangr lvlmangr dialog	Displays the Level Manager dialog box
	Shift +F9	wset add; wset drop	Changes display order
	Shift +F10	<open>	Open for additional assignment
	Shift +F11	<open>	Open for additional assignment
	Shift +F12	<open>	Open for additional assignment

** These function keys activate commands that only affect View 1. If preferred, however, they can be set up to allow the user to select the view in which the operation will occur.*

The suggested function key assignments for the standard Bridge Section function key menu are shown in the table below:

	Key	Assignment
Drawing Assist Tools	F1	netspex designer navigate linear:structures:solid object
	F2	netspex designer navigate linear:structures:hidden concrete
	F3	netspex designer navigate linear:structures:metal reinforcement
	F4	netspex designer navigate linear:structures:object centerlines
	F5	netspex designer navigate linear:structures:ground lines
	F6	netspex designer navigate pattern:structures:cross hatching
	F7	netspex designer navigate linear:structures:active points
	F8	netspex designer navigate linear:structures:alt position lines
	F9	netspex designer navigate linear:structures:roadway centerlines
	F10	lt=term
	F11	lt-ldrtrm
	F12	iplot
View and Display Settings	Alt+F1	am=f:\data\brkey.mnu,fk
	Alt+F2	am=f:\data\metbrkey.mnu,fk
	Alt+F3*	rc=f:\data\bridge1.cel
	Alt+F4*	rc=c:\my_data\engcel.cel
	Alt+F5*	ct=c:\my_data\color.tbl
	Alt+F6*	ct=f:\data\itdcolor.tbl
	Alt+F7*	aa=0
	Alt+F8*	as=1
	Alt+F9	lock fence inside;set tpmode del;aa=0;as=1
	Alt+F10	set tpmode loc
	Alt+F11	lock fence clip
	Alt+F12	as=1.4
Input/Measuring/File Tools	Ctrl+F1	netspex designer navigate annotation:structures:15text
	Ctrl+F2	netspex designer navigate annotation:structures:10text
	Ctrl+F3	netspex designer navigate annotation:structures:7.5text
	Ctrl+F4	netspex designer navigate annotation:structures:5text
	Ctrl+F5	netspex designer navigate annotation:structures:3.75text
	Ctrl+F6	netspex designer navigate annotation:structures:2.5text
	Ctrl+F7	netspex designer navigate annotation:structures:1.875text
	Ctrl+F8	netspex designer navigate annotation:structures:1.25text
	Ctrl+F9	netspex designer navigate annotation:structures:.625text
	Ctrl+F10	set tpmode dist
	Ctrl+F11	lock fence overlap
	Ctrl+F12	as=1.2
Applications/Dialog Boxes	Shift+F1	netspex designer navigate annotation:structures:9.375text
	Shift +F2	netspex designer navigate annotation:structures:18.75text
	Shift +F3	netspex designer navigate annotation:structures:28.125text
	Shift +F4	netspex designer navigate annotation:structures:37.5text
	Shift +F5	netspex designer navigate annotation:structures:56.25text
	Shift +F6	netspex designer navigate annotation:structures:75text
	Shift +F7	netspex designer navigate annotation:structures:93.75text
	Shift +F8	netspex designer navigate annotation:structures:115.5text
	Shift +F9	netspex designer navigate annotation:structures:187.5text
	Shift +F10	set tpmode del
	Shift +F11	lock fence inside
	Shift +F12	on=1-63

1.22.2 Existing Standards Documentation

Several documents with CADD standards information exist both on the Web and on the ITD Publications CD ROM. ProSoft has reviewed these documents for the purposes of gathering existing CADD standards information and assessing the current state of the standards documentation.

The Design Manual is a well-executed, comprehensive source of information about all aspects of project development. Chapter 9 addresses plan production. ProSoft has conducted a review of the January 2002 revision of this document. This revision contains Metric unit references, which is the unit system on which ITD is currently standardized. When the new CADD standards are implemented, the document will have to be updated to reflect the changes in the standard and modified to display English unit examples.

While some plan production standards are included in the Design Manual, the only criticism of this manual for the conveyance of CADD standards intent is that it is a voluminous document that is primarily intended to convey Idaho Transportation Department design practices rather than software use practices. This makes it more difficult to extract the CADD standards information that it contains, as it relates to the proper use of CADD and design software, both for plan production internally and the generation of plan sets by consultant and contractor organizations. Data storage structures, file naming conventions, level structures, and consultant and contractor software use and submittal practices, are not currently addressed in the manual.

There are a few documents on the ITD Web site that are also used to communicate standards intent. The Consultant CADD Specifications document provides instructions on the proper sheet size, delivery methods, and CADD platform format for design deliverables. Additional information in the document briefly addresses file naming, level assignments, and symbology.

The CADD System File Naming Convention document, which is also available for download from the ITD Web site, outlines the approved conventions for naming different types of project design files. This information is maintained separately from the ITD Design Manual.

The documents that are available from the ITD Web site are interspersed with various other downloadable files, most of which are sample CADD drawings or prototypes to be used in plan production. One of the tasks that will be completed later in the project is the development of a resource delivery application and Web site for consultants. This site will provide a location for the download of the NetSPEX Deliverable Workspace, which will be an installable version of the ITD CADD standards database, in XML format, that can be delivered to consultants and contractors for use on ITD projects. ProSoft recommends that ITD consider segregating downloadable documentation from CADD resources to make it easier for the consultant or contractor to make the distinction between documents and CADD files.

One other point that should be emphasized is that NetSPEX has the ability to build both online and printable versions of a CADD standards document directly from the standards database. These documents are dynamic in the sense that they update automatically whenever modifications to the database are made. If this feature were implemented, some information that would not exist in the database (i.e., naming conventions, directory structures, explanatory text) would have to be added. This document could be accessed directly from the NetSPEX Designer interface.

1.22.2 Recommended Standards Documentation

While it is both logical and helpful to include instructions for CADD standards and plan production in the ITD Design Manual, ProSoft also recommends that this information be compiled into a separate document that addresses all aspects of the standards that are related specifically to CADD and supporting roadway design software. Ideally, this document would include information about project set up, naming conventions, plan production (similar to what is contained in the ITD Design Manual), design and sheet files, annotation standards, dimensioning standards, InRoads resource overviews, NetSPEX instructions (as related to CADD standards), etc. For improved accessibility, this document should be accessible from the NetSPEX Designer interface.

1.23.1 Data Exchange Standards

Data exchange was discussed during the standards review meeting held in December of 2002. Contractors are currently required to deliver their work in MicroStation .DGN format, which means that they are technically obligated to translate and verify the accuracy and completeness of the .DGN file deliverable if the work was done on another CADD platform, such as AutoCAD. In spite of this requirement, however, ITD has occasionally had to translate drawings. The default MicroStation translation settings are currently used to convert these drawings.

One of the issues that that ITD constantly faces is the fact that cities, municipalities, and utility companies in Idaho use AutoCAD extensively, and in many cases, exclusively. Electronic deliverables are always required, although they don't currently have to conform to ITD standards. This can change, however, once the new ITD CADD standards are implemented with NetSPEX, provided the Department decides to support the AutoCAD platform with symbol, font, and line type resources.

1.23.2 Make recommendations for data exchange standards

NetSPEX has the unique ability to support both AutoCAD and MicroStation from the same CADD standards database. Once AutoCAD CADD resources have been added to the workspace, data exchange standards can be set up to facilitate easy translation of CADD data to and from AutoCAD. This will greatly enhance the ability of ITD to share CADD data with contractors, cities, municipalities, and utility companies. The creation of these resources, if implemented, will likely occur during a later phase.

ProSoft has examined the ITD custom line styles for compatibility with AutoCAD and has submitted its findings. In general, most of the custom line styles can be recreated in AutoCAD, although components with multiple parallel lines are not supported. ProSoft suggests that to address these areas of incompatibility between the two platforms, substitute line styles should be used in AutoCAD. During the translation process, these line styles could be mapped to their proper counterparts in MicroStation using line style mapping tables.

1.24.1 Current Plotting Practices and Workflows

Plotted documents for completed plan sets are generated using Bentley's Iplot software. This software is considered the Department's plotting standard, although a few users occasionally use MicroStation's plotting features to produce check plots.

Each of the six district offices and the section groups at ITD headquarters has its own unique iplot.set file. These files are set up to point to the local plot server at these

locations. Iplot is also set up to identify which reference file attachments are to be plotted with gray scaling through interpretation of the reference file logical name.

With the changes in level structure in many of the design file types, the Iplot pen tables will have to be checked and modified in some cases to comply with the new CADD standards.

1.24.2 Plot Resource Storage Location

Standard plot resources will be stored in the CADD resource directory structure in the locations shown below:

CADD_Standards\Bentley\Iplot\Settings
CADD_Standards\Bentley\Iplot\Work

Project-specific plot resources will be stored in the project directory structure in the location shown below:

Prjnnn\Project_Development\Project_Resources\Miscellaneous

1.24.3 Standard Paper Sizes and Plot Scales

The 11”x17” sheet size is considered the standard size for plotted output. There are, however, a few known exceptions to this standard. For example, while the Bridge Section often uses the 11”x17” format, it will occasionally use 22”x34” sheets. Also, the record of survey is considered a special kind of sheet file that is used to file surveys with county offices. This sheet is required to fit in plat books, which utilize a totally different sheet size standard and are never included in a set of contract plans.

Several plot scales will be maintained. These scales are outlined in the table under the description of task 1.16.1 above.

1.25.1 Application Software Products

In addition to MicroStation, ITD uses several application software products, primarily for file management and design production. The software products that ITD is currently using are included in the table below.

Application Software
AutoTURN
Axiom Productivity Tool Kit (used at ITD Headquarters)
Fieldworks
GuidSIGN
InRoads
InRoads Bridge
InRoads Storm and Sanitary Sewer
InRoads Survey
Iplot
I/RAS B
MicroStation/J

1.25.2 Impact of Application Software Products on the Workspace Configuration

The workspace configuration will address all aspects of the operation of MicroStation/J. In addition to MicroStation, however, some of the software products that are listed in the table above also rely upon configuration variables to ensure proper operation. These variables can be taken into account within the structure of the ITD workspace configuration, so no significant impact to the workspace is anticipated.

1.26.1 Custom Applications

ITD has invested considerable effort in the development of a custom, MDL-based application called Automated Pay Item (API). This application, which was developed by the University of Idaho for use by the Idaho Transportation Department, runs directly inside of MicroStation and is used for summary and cost analysis purposes. At present, the software is designed for operation with Metric units. However, ProSoft will be employed to modify the software to operate with English units and will add several other requested enhancements.

Other than the API application, no other mission-critical custom applications are known to exist at this time.

1.26.2 Impact of Custom Applications on the Workspace Configuration

MDL applications, JMDL applications, and MicroStation BASIC macros can be easily adapted for use with the workspace configuration. The ITD workspace has been designed to allow such applications to be located by the configuration and loaded either automatically upon startup, or on demand if preferred. A repository for these applications has been created for each discipline group within the CADD resource directory structure. This structure will allow the workspace to readily determine access locations from which these applications can be initiated.

1.27.1 Archival and Retrieval Procedures for Project Data

The current procedure for archiving data is to send an email to the CADD Support Group requesting that the project be removed from active status and placed in an archive location. The project to be archived is pulled off of the district server and placed in an archive folder on a backup server. A CADD public share has been set up on the IS Department CADD server to allow districts to transfer data from their servers to other district or headquarters servers.

Design files, InRoads data files, ASCII point files, and other supporting resources have typically been included with the archive. Any Word documents, Excel spreadsheets, and PDF files that are considered part of the project are also generally archived.

Occasionally, data is pulled from the archive and brought back to temporary active status. When archived data is needed by a district or section, a request is sent to the CADD Support Group, who retrieves the data from archive and restores it to the CADD public share location.

Some of the most significant problems with the current archival procedure have been the lack of a standard project directory structure and the absence of uniform file naming conventions. Significant guesswork has often been required to decipher file names and determine which folders to include in the archive. This problem will be mitigated with the implementation of the file naming conventions and new project directory structure.

1.27.2 Archive Recommendations

The determination of what to archive for the purpose of maintaining historical records and retrieving important project data for future design-related purposes can be difficult due to the unpredictability of future events and requirements. If care is not exercised, however, archive servers can quickly become cluttered with ancillary and unnecessary project information. The determination, therefore, of an appropriate balance between the extent of the archive and the storage space that it will occupy on the server is a necessary exercise.

As mentioned above, archives currently include many critical design files, supporting design resources and documents. At a minimum, future archives should include the following:

- Model design files (from the various discipline folders)
- Sheet design files (from the Plan_Sheets folder)
- InRoads data files (from the Project_Resources folder and subfolders)
- Documentation and reports (from the various discipline documentation folders)

Optionally, if there is ample available server storage space, the following may also be archived:

- Correspondence (from the various discipline correspondence folders)
- Photographs (from the various discipline photo folders)

MicroStation/J has a utility called MicroStation Archive which, much like WinZip or PKZIP, creates a compressed archive file that can consist of design files, cell libraries, resource files, documents, spreadsheets, ASCII files, InRoads data files, etc. An available option lets the administrator choose whether or not to store the files with their folder locations, that during retrieval, allows the folder structure to be rebuilt. The archive file can reside in any desired archive server location.

The Idaho Transportation Department may already be aware of this feature. However, while this utility may solve some immediate archiving problems, particularly those that are associated with file storage and disk space resources, ProSoft recommends that ITD consider other archiving options. The primary reason for this recommendation is that Bentley's future direction in regard to packaging and archiving is unclear.

To cite an example, MicroStation V8 contains a much more limited archive capability than MicroStation/J. The utility now only allows an existing archive, presumably those that were created in MicroStation/J, to be extracted to a server. No provision is made for the creation of new archive files. In place of the MicroStation Archive utility, a new Packager has been introduced in MicroStation V8. This utility uses a wizard interface to help facilitate the selection and packaging of files. The Packager is apparently based on a different compression file format than the MicroStation Archive utility. This now appears to be the preferred way in MicroStation V8 to package CADD and related data in a compressed format.

New hardware and increased storage space is not as costly as it once was. For this reason, ITD may simply choose to continue copying data to archive servers in an uncompressed format. Other options, which have probably already been considered, would be to copy data to a storage medium, such as various types of disk storage. However, due to the rapid changes in technology, what may seem like a viable storage option today may very well have a limited shelf life in the future. For this reason, archiving methods should always be considered more temporary than long term and, depending on how long archives will be maintained, ITD should be prepared to adapt to future technology as it becomes available.

Regardless of the method selected, the new project directory structure, if adhered to by users after it is generated with the Project Builder application, will greatly enhance the ability of the CADD Support Group to collect the data to be archived and to retrieve and restore it later.

1.28.1 Current practices for Delivery of CADD Resources to Consultants

A significant percentage of project design work is currently assigned to consultants, although the trend is moving in the direction of more in-house design work. When project work is assigned, a standard agreement and package is sent to the consultant. Each district has consultant administrators who are assigned to interact with the consultant during the course of a project. In recent years, a problem that has arisen is that many of the newer engineers are not as informed about existing procedures and standards as are their more experienced counterparts. These engineers are often the ones who are tasked with writing the consultant contracts.

To provide resources to consultants and contractors, files are often emailed or sent on CDs. Currently, there is no dedicated FTP site for the download of project data. Consultants are made aware of the ITD CADD web pages, which are used to deliver downloadable versions of the CADD resources and supporting documentation. Prior to beginning ITD work, they are required to check these pages to determine whether or not they have the most current versions of the CADD resources. The ITD Web site contains downloads for the current Metric resources and some limited English resources. Some districts have experimented with distribution of project data through Viecon. There are at least a couple of active projects that are using this technology. However, no records are currently being kept regarding what data is sent to consultants.

1.28.2 Resources to be Packaged for Consultant Use

NetSPEX has the ability to package the CADD standards database and associated MicroStation and InRoads resources into a deliverable workspace that can be installed by consultants or disconnected users. When the deliverable workspace package is generated, all relevant symbol, font, and line style resources that are selected by the CADD standards administrator are included. They are placed in a resource directory structure that is created by the deliverable workspace when it is installed. The workspace configuration that is generated by the NetSPEX Deliverable Workspace Packager automatically points to the location in which these resources are installed.

1.28.3 Practices for Receiving Resources and Deliverables

Instructions for the preparation of CADD data for delivery to ITD are found in the Consultant CADD Specifications document that is available from the Idaho Transportation Department Web site. Consultants must submit a printed copy of all of the drawings in the contract plan set, with the requirement that they be printed on durable, reproducible stock with the engineer's signature. ITD does allow electronic signatures, provided that there is registration and approval from the Board of Professional Engineers and Land Surveyors. Printed plans are required to be submitted on 11"x17" sheets. Structure plan sets are required to be submitted on 22"x34" sheets.

In addition to the printed copy, ITD also requires electronic copies of the drawings to be delivered in MicroStation .DGN format. The requirement in this document, which probably has not been updated recently, is that files be delivered in MicroStation 5.5 format or higher. According to existing documentation, electronic files can be submitted on one of the following storage mediums:

- 3.5” floppy disk (without backup files)
- 8mm magnetic tape cartridge
- CD-ROM
- 100 MB Zip Disk

The Idaho Transportation Department does allow consultants to convert their CADD data from other formats. However, if this is done, the consultant is required to check for conversion errors. They may also be required periodically during the course of the project to prove that they can address and correct any conversion errors. Consultants are required to check their drawings for quality assurance.

Some consultants will include InRoads data files in their package of deliverables. However, many consultants are using more current versions of InRoads, which presents data compatibility problems. The same is true for .DGN deliverables from consultants who are using MicroStation V8.

ProSoft Assessment

The CADD standards that are represented in this document are, in ProSoft's assessment, very complete and ready for implementation with the NetSPEX standards deployment software. Software users both inside and outside the Department should find them relatively easy to adapt to their production workflows. Furthermore, the introduction of NetSPEX will firmly establish the use of the ITD CADD and design standards in the production environment.

The ITD CADD standards should, however, be examined on a regular basis to ensure that they adequately address project and user needs, conventions, and workflows. Organizations that are usually most successful with standards implementation are typically those that allow for adaptability and maturation of the standard. When implemented, some users will have input and will request changes or enhancements that they feel are critical to their particular production workflows. Many of these suggestions will have validity. Others will be nothing more than personal preferences. The Idaho Transportation Department will have to weigh the significance of the requests to determine whether or not they are worthy of inclusion.

Ideally, a formal process, whether it is a Web-based request form, a printable request form, or some other method, should be employed to receive and evaluate user requests. However, if at all possible, immediate and frequent additions to the standard should usually be avoided in favor of a more measured and regulated release schedule. NetSPEX will allow immediate changes to standards components to be implemented throughout the entire Department, although to avoid confusion, ITD may also wish to update its documentation and InRoads resources if they are impacted by the changes. This may take additional time to prepare. Too many revisions of a standard in a short time period can be confusing to a user and can have an impact on existing projects if not implemented with enough forethought and communication. The Idaho Transportation Department may want to consider using the NetSPEX dependency or copy features to help mitigate this potential problem if many revisions of the standard are created.

Appendix A

The approved drawing types for the new CADD standards are listed in the tables on the following pages. The tables include the level structures as defined at the time of the creation of this report. While tables are listed for each of the approved model and sheet drawing types, some level structures have not yet been completed.

In many instances, the ITD CADD standards allow for the use of multiple colors, line styles, or line weights on a single level. These properties are marked with an asterisk (*) in the tables. The letter “C” in the color, weight, or line styles properties columns indicates levels with components that are represented by custom line styles.

Border (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1	GRAPH_D1DISCLAIM	District 1 Disclaimer	0	0	0
2	GRAPH_D2DISCLAIM	District 2 Disclaimer	0	0	0
3	GRAPH_D3DISCLAIM	District 3 Disclaimer	0	0	0
4	GRAPH_D4DISCLAIM	District 4 Disclaimer	0	0	0
5	GRAPH_D5DISCLAIM	District 5 Disclaimer	0	0	0
6	GRAPH_D6DISCLAIM	District 6 Disclaimer	0	0	0
7	GRAPH_PRELIM	PRELININARY / NOT APPROVED FOR CONST.	3	1	0
8	GRAPH_STAMP	Engineers Stamp	0	Varies	0
9	GRAPH_D9DISCLAIM	District 9 Disclaimer	0	0	0
10					
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12					
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14					
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16					
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46					
47					
48					
49					
50	ANNO_TEXT	Sheet-Specific Text and Callouts	0	0	0
51	ANNO_NOTES	Sheet-Specific General Notes	0	0	0
52	ANNO_PATTERN	Sheet-Specific Patterns	0	Varies	Varies
53	ANNO_SYMBOL	Sheet-Specific Symbols (cells)	0	Varies	Varies
54	ANNO_TITLE	Title Block Text	0	Varies	Varies
55	ANNO_PROFGRID	Profile Grid	0	Varies	Varies
56	ANNO_PROFTEXT	Profile Text	0	1	0
57	ANNO_LINEWORK	Sheet Line Work	0	Varies	Varies
58	ANNO_BORDER	Title Block and Border	0	Varies	Varies
59	ANNO_DIMEN	Sheet-Specific Dimensions	0	Varies	Varies
60	RSVD_1	Reserved 1 (non-print)	0	2	0
61	RSVD_2	Reserved 2 (non-print)	0	2	0
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

Design (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1					
2	SURV_CTRLN	Surveyed Control Lines	0	1	0
3	SURV_POINT	Benchmarks, Set Brass or Alloy Cap, Set Rebar	0	1*	0
4					
5					
6					
7					
8					
9					
10	RDWY_CURB	Curb & Gutter	3	0	C*
11	RDWY_EDGERD	Edge of Paved / Unpaved Road, Edge of Oil	0	1	C*
12	RDWY_BARRIER	Concrete / Metal Guardrail, Attenuators, Median Barriers	0	2	C*
13	RDWY_HORPNTS	PC's, PT's, PI's, Angle Points, Event Points	0	0	0
14	RDWY_HORALIGN	Surveyed /Designed Center Lines, Station Tick Marks	0	3	0
15	RDWY_APPRCH	Paved / Unpaved Approaches, Parking Lots	3	2	0
16	RDWY_SDWLK	Sidewalks, Back of Sidewalks, Misc. Flat Concrete	3	2	0
17	RDWY_CLOSURE	Road Closure	0	1	C
18	RDWY_MAILBOX	Mail Box	0	0	0
19					
20	SURF_GROUND	Natural Ground Lines	0	0	2
21	SURF_SUBGRD	Subgrade, Sub-Subgrade Lines	118	1	0*
22	SURF_BASELN	Top of Base Lines	7	1	0*
23	SURF_FINGRD	Finish Grade Lines	3*	1	0*, C*
24	SURF_FENCE	Fences	0	1	0*, C*
25	SURF_TRAIL	Misc. Paths & Trails	174	1	2
26	SURF_DITCH	Top of Ditch, Bottom of Ditch, Backslope of Ditch	120	0	C*
27					
28					
29	SURF_CHNLCHG	Channel Change	120	2	C
30					
31	STRC_ROAD	Bridges, Abutments, Piers, Overpass, Underpass	0	3	0
32	STRC_RETWALL	Retaining Walls	0	2	C
33	STRC_NOISEWALL	Noise Walls	0	2	C
34	STRC_BLDNG	Building Footprint, Foundations	0	0	0*
35	STRC_MISC	Pads, Flagpoles, Bollards, Tanks	0	1	0
36	STRC_RAIL	Railroad 1 Track	3	0*	0*, C*
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50	ANNO_SURV	Misc. Survey Notes	0	0	0
51	ANNO_ALIGN	Curve Data, Bearings, Stationing, Point Text	0	1	0
52	ANNO_RDWY	Misc. Roadway Notes, Street Names	0	0	0
53	ANNO_SURF	Misc. Surface Text	0	0	0
54	ANNO_STRC	Misc. Structure Notes	0	0	0
55	ANNO_RAIL	Misc. Railroad Notes	3	0	0
56	ANNO_GRID	Grid Notes	0	0	0
57	ANNO_PHOTOGRM	Photogrammetry Notes	0	0	0
58					
59					
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

* Indicates that level uses multiple colors, styles, weights, or custom line styles.

Detail Sheets (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1					
2					
3					
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46					
47					
48	DETL_PLNWRK	Proposed Line Work	varies	varies	varies
49	DETL_ELNWRK	Existing Line Work	varies	varies	varies
50	ANNO_TEXT	Detail Text and Callouts	0	0	0
51	ANNO_NOTES	Detail General Notes	0	0	0
52	ANNO_PATTRN	Detail Patterns	0	varies	varies
53	ANNO_SYMBOL	Detail Cells	0	varies	varies
54					
55					
56					
57					
58					
59	ANNO_DIMEN	Detail Dimensions	0	varies	varies
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

Foundation Investigation (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1					
2					
3					
4					
5					
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54					
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56					
57					
58					
59					
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

Hydraulics (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26	SURF_DITCH	Ditches, Top of Ditch, Flow Line of Ditch	120	1*	C*
27					
28					
29	SURF_WATER	Channel Change	120	2	C
30	STRUC_HYDRAUL	Storm Sewer Manholes	121*	1*	0*, C*
31					
32					
33					
34					
35					
36					
37					
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39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
51					
52					
53	ANNO_SURF	Misc. Surface Related Notes & Text	0	0	0
54	ANNO_STRC	Misc. Structure Related Notes & Text	0	0	0
55					
56					
57					
58					
59					
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

* Indicates that level uses multiple colors, styles, weights, or custom line styles.

Illumination (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1	ILLMX_POLE	Pole, Mast Arm	1	0	0
2	ILLMX_LUMHEAD	Luminaire Head	1	0	0
3	ILLMX_CONCJBOX	Illumination Concrete Junction Box	1	0	0
4	ILLMX_COMPJBOX	Illumination Composite Junction Box	1	0	0
5					
6	ILLMX_CONDUIT	Illumination Conduit	1	0	4
7					
8					
9					
10	ILLMX_CTRLR	Power Source, Electrical Service Pedestal	0	0	0
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25	ILLMP_POLE	Pole, Mast Arm	1	0	0
26	ILLMP_LUMHEAD	Luminaire Head	1	0	0
27	ILLMP_CONCJBOX	Illumination Concrete Junction Box	1	0	0
28	ILLMP_COMPJBOX	Illumination Composite Junction Box	1	0	0
29					
30	ILLMP_CONDUIT	Illumination Conduit	1	0	4
31					
32					
33					
34	ILLMP_CTRLR	Power Source, Electrical Service Pedestal	0	0	0
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50	ANNO_ILLUM	Misc. Illumination Notes & Text	0	1	0
51					
52					
53					
54					
55					
56					
57					
58					
59					
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

Landscape (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1					
2					
3					
4					
5					
6					
7					
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48					
49					
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51					
52					
53					
54					
55					
56					
57					
58					
59					
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

Minor Structures (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1	STRC_OBJLINE	Solid Object	0*	3*	0
2	STRC_HDNLINE	Hidden Concrete	0	1	5
3	STRC_REBAR	Metal Reinforcement	6		
4					
5	STRC_DTLCTRLN	Object Centerlines	4	2	7
6	STRC_GRNDLN	Existing / New Ground Lines in Profile	8	2*	2*
7	STRC_PATTRN	Cross Hatching, Cross Section Patterns	10*	0	0
8	STRC_ACTVPTS	Active Points	14	5	5
9	STRC_PHTLINE	Alternate Position Lines	11	1	6
10					
11					
12					
13					
14	STRC_RWYCTRLN	Roadway Centerlines	8	1	7
15					
16					
17					
18					
19					
20	STRC_IDXCONTR	Contour Lines - Major	26	2	0
21	STRC_INTCONTR	Contour Lines - Minor	30	0	0
22					
23					
24					
25					
26					
27					
28					
29					
30					
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46					
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49					
50	ANNO_SHEET	Basic Sheets	varies	varies	varies
51					
52	ANNO_SMLPRINT	11" x 17" Small Print Sheet	varies	varies	varies
53	ANNO_EGRSTMP	Engineers Stamp	0	varies	0
54	ANNO_GENNOTE	General Design Notes, Dimension Lettering, Lines	0*	0*	0
55					
56					
57					
58					
59					
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

* Indicates that level uses multiple colors, styles, weights, or custom line styles.

Profile (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1	SURV_POINT	Benchmark	0	2	0
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13	RDWY_VERTPNTS	PVC's, PVT's, PVI's, Vertical Angle /Event Point	0	1	0
14	RDWY_VERTALGN	Profile Grade Line	0	3	0
15					
16					
17					
18					
19					
20	SURF_EXGRNDLNE	Existing Ground Line	0	1	2
21	SURF_SUBGRD	Sub-Sub-Grade	118*	1	1*
22	SURF_BASELN	Base, 3/4	7*	1	5*
23	SURF_FINGRD	Finish Grade	0	3	0
24					
25					
26	SURF_SPDITCH	Special Ditch Grade	120	1	C
27					
28					
29					
30	STRC_PIPE	Pipe Culvert, Pipe Arch, Pipe Siphon	120	3	C
31	STRC_STRUCS	Bridges, Box Culverts, Stiff-Leg Box Culverts	0	2	0
32					
33					
34					
35					
36					
37					
38					
39					
40	UTIL_TELE	Telephone Cable, Pole, Pole Anchor, Jbox, Transmission Tower	184	0*	0, C*
41	UTIL_FIBOPTIC	Fiber Optic Cable, Junction Box, Transmission Tower	184	2	0, C
42	UTIL_ELEC	Electrical Cable, Pole, Pole Anchor, Jbox, Meter, Trans Tower	3	0*	0, C
43	UTIL_PIPEBELL	Pipe with Directional Bell	120	2	C
44	UTIL_PIPE	Pipe	188	2	C
45	UTIL_GAS	Gas Pipe, Valve, Riser, Meter, Pump	188	2	0, C
46	UTIL_PETRO	Oil Pipe, Valve, Riser	188	2	0, C
47	UTIL_WATER	Water Pipe, Hydrant, Meter, Valve, Riser	120	2	0, C
48	UTIL_SEWER	Sanitary Sewer Pipe, Manhole	121	2	0, C
49	UTIL_IRRIG	Irrigation Pipe, Siphons, Manholes, Structures, Headwalls, etc.	120	2	0, C
50	ANNO_SURV	Benchmark Text	0	2	0
51	ANNO_ALIGN	Curve Data, Bearings, Stationing, Point Text	0	1	0
52	ANNO_UTIL	Utility Text	0	1	0
53	ANNO_SURF	Natural Ground Line Text, Spot Elevations, Subgrade Text	0*	0	0
54	ANNO_STRC	Special Ditch Text	0*	0	0
55	ANNO_RAIL	Railroad Text	3	0	0
56	ANNO_GRID	Grid Lines, Text	0	varies	varies
57	ANNO_AXIS	Axis Lines, Text	0	varies	varies
58	ANNO_MISC	Misc. Profile Text	0	0	0
59	ANNO_DIMEN	Dimensions	0	0	0
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

* Indicates that level uses multiple colors, styles, weights, or custom line styles.

Record of Survey (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1					
2					
3					
4					
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58					
59					
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

Right-of-Way (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1	BNDYX_SURVPNT	Section, Quarter, 1/16 Corners, Caps, Set Stones	0	0*	0
2	BNDYX_SECLINE	Township & Range, Section, Quarter Section, 1/16 Section Lines	0	2*	0, C*
3	BNDYX_MISCPNT	Premarks, Traverse Control, Benchmarks	0	0*	0
4	BNDYX_POLPNT	State, County, City Limits, Forest, Indian Boundary Points	0	2*	0
5	BNDYX_POLLINE	State, County, City Limits, Forest, Indian Boundary Lines	0	2*	C*
6					
7	BNDYX_ITD	Maintenance & District Boundaries	0	0	7
8					
9					
10	ROWX_PROPPNT	Found/Set Rebar, Found Iron Pipe	0	1	0
11	ROWX_PROPLINE	Property, Subdivision, Lot, Block & etc. Lines	0	0	C*
12					
13	ROWX_PNT	R/W Markers	0	0	0
14	ROWX_LINE	Existing R/W	0	0	0, C*
15		.			
16					
17	ROWX_ESMNTLINE	Existing Easement Line	0	0	C*
18					
19					
20					
21					
22					
23	BNDYP_SURVPNT	Section, Quarter, 1/16 Corners, Caps, Set Stones	0	0*	0
24	BNDYP_SECLINE	Township & Range, Section, Quarter Section, 1/16 Section Lines	0	2*	0, C*
25	BNDYP_MISCPNT	Premarks, Traverse Control, Benchmarks	0	0*	0
26	BNDYP_POLPNT	State, County, City Limits, Forest, Indian Boundary Points	0	2*	0
27	BNDYP_POLLINE	State, County, City Limits, Forest, Indian Boundary Lines	0	2*	C*
28					
29	BNDYP_ITD	Maintenance & District Boundaries	0	0	7
30					
31					
32	ROWP_PROPPNT	Set Rebar, Set Iron Pipe	0	1	0
33	ROWP_PROPLINE	Property, Subdivision, Lot, Block & etc. Lines	0	2	C*
34					
35	ROWP_PNT	R/W Markers	5	2	0
36	ROWP_LINE	Proposed R/W	5	2	C*
37					
38					
39	ROWP_ESMNTLINE	Proposed Easement Line	5	1	C*
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50	ANNO_POLBNDY	Political Boundary Line & Point Text	0	1	0
51	ANNO_PROP	Property Line & Point Text	0	1	0
52	ANNO_ITDBNDY	Maintenance & District Boundary Text	0	1	0
53	ANNO_ROW	R/W Line & Point Text	0	1	0
54					
55	ANNO_ESMNT	Permanent, Temporary, Utility & Right of Entry Text	0	1	0
56					
57					
58					
59					
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

* Indicates that level uses multiple colors, styles, weights, or custom line styles.

Signals (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1	SGNLX_POLE	Pole, Mast Arm	2	0	0
2	SGNLX_HEAD	Signal Heads, Pedestrian Heads	2	0	0
3	SGNLX_CONCJBOX	Signal Concrete Junction Box	2	0	0
4	SGNLX_COMPJBOX	Signal Composite Junction Box	2	0	0
5					
6	SGNLX_CONDUIT	Signal Conduit	2	0	7
7	SGNLX_HVLTSPARE	High Voltage Spare	2	0	7
8	SGNLX_INCONCOND	Signal Interconnect Conduit	6	0	6
9	SGNLX_INCONJBOX	Signal Interconnect Junction Box	6	0	0
10	SGNLX_CTRLR	Power Source, Signal Controler Cab, Elec Service Ped.	0*	0	0*
11	SGNLX_RAILCOND	Railroad Signal Preemption Conduit, Cab.	10	0	0*
12					
13	DETX_CONCJBOX	Detection Concrete Junction Box	3	0	0
14	DETX_COMPJBOX	Detection Composite Junction Box	3	0	0
15					
16	DETX_CAMERA	Video Detection Camera	3	0	0
17	DETX_CONDUIT	Detection Conduit	3	0	3
18	DETX_VIDEOZONE	Video Detection Zone	3	0	0
19	DETX_LOOP	Detection Loop	3	0	0
20	DETX_LVLTSPARE	Low Voltage Spare	3	0	3
21	DETX_EMERCOND	Emergency Vehicle Preemption Conduit	3	0	1
22	DETX_EMERDET	EMergency Vehicle Preemption Detector	3	0	0
23					
24					
25	SGNLP_POLE	Pole, Mast Arm	2	0	0
26	SGNLP_HEAD	Signal Heads, Pedestrian Heads	2	0	0
27	SGNLP_CONCJBOX	Signal Concrete Junction Box	2	0	0
28	SGNLP_COMPJBOX	Signal Composite Junction Box	2	0	0
29					
30	SGNLP_CONDUIT	Signal Conduit	2	1	7
31	SGNLP_HVLTSPARE	High Voltage Spare	2	0	7
32	SGNLP_INCONCOND	Signal Interconnect Conduit	6	1	6
33	SGNLP_INCONJBOX	Signal Interconnect Junction Box	6	0	0
34	SGNLP_CTRLR	Power Source, Signal Controler Cab, Elec Service Ped.	0*	0	0*
35	SGNLP_RAILCOND	Railroad Signal Preemption Conduit, Cab.	10	1	0*
36					
37	DETP_CONCJBOX	Detection Concrete Junction Box	3	0	0
38	DETP_COMPJBOX	Detection Composite Junction Box	3	0	0
39					
40	DETP_CAMERA	Video Detection Camera	3	0	0
41	DETP_CONDUIT	Detection Conduit	3	0	3
42	DETP_VIDEOZONE	Video Detection Zone	3	0	0
43	DETP_LOOP	Detection Loop	3	0	0
44	DETP_LVLTSPARE	Low Voltage Spare	3	0	3
45	DETP_EMERCOND	Emergency Vehicle Preemption Conduit	3	0	1
46	DETP_EMERDET	EMergency Vehicle Preemption Detector	3	0	0
47					
48					
49					
50	ANNO_SIGNL	Misc. Signal Notes & Text	0	1	0
51					
52					
53					
54					
55					
56					
57					
58					
59					
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

* Indicates that level uses multiple colors, styles, weights, or custom line styles.

Signing and Pavement Marking (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1	SIGN_POST	New 1, 2 Post, Remove and Reset 1, 2 Post	0	2	0
2					
3	SIGN_EXIST	Retain and Protect 1, 2 Post	0	0	0
4					
5					
6					
7					
8					
9	SIGN_PORT	Dynamic Message Signs	0	2	0
10	PVMRK_WHITE	Skip, Edge Lines, Dashes, Lane Lines	0	1	0, C*
11	PVMRK_YELLOW	Skip, No Passing, Double Yellow, Edge, Dash, Bar	20	0*	0, C*
12	PVMRK_STOPBAR	Stop Bar	0	0	C
13	PVMRK_CROSSWK	Crosswalk	0	0	C
14	PVMRK_CROSSBAR	Crosswalk Cross Bar	0	0	C
15	PVMRK_RAILRD	Railroad Crossing	0	0	0
16	PVMRK_ARROWS	Lt. or Rt Turn Arrow, Other Arrows	0	0	0
17	PVMRK_TEXT	Pavement Marking Text (generally 8')	0	0	0
18	PVMRK_BIKELN	Bike Rider Pavement Marking, Lane Arrow	0	0	0
19	PVMRK_BIKETXT	Bike Lane Pavement Marking Text (generally 4')	0	0	0
20	PVMRK_DELIN	Delineators	0	0	0
21					
22					
23					
24					
25					
26					
27					
28					
29					
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47					
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49					
50	ANNO_SIGN	Misc. Signing Notes & Text	0	1	0
51	ANNO_MRKG	Misc. Pavement Marking Notes & Text	0	1	0
52	ANNO_DILEN	Misc. Delineator Related Notes & Text	0	1	0
53					
54					
55					
56					
57					
58					
59					
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

* Indicates that level uses multiple colors, styles, weights, or custom line styles.

Soils Profile (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1					
2					
3					
4					
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9					
10					
11					
12					
13	RDWY_VERTPNTS	PVC's, PVT's, PVI's, Vertical Angle and Event Points	0	1	0
14	RDWY_VERTALGN	Profile Grade Line	0	3	0
15					
16					
17					
18					
19					
20	SURF_EXGRNDLNE	Existing Ground Line	0	1	2
21					
22					
23	SURF_FINGRDE	Finish Grade	0	3	0
24					
25					
26					
27					
28					
29					
30					
31					
32	BORING_LOG	Test Hole	0	0*	0
33	BORING_SYMB	Boring Symbols	0	0	0
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
51	ANNO_ALIGN	Stationing	0	1	0
52					
53	ANNO_SURF	Natural Ground Line Text, Soils Text, Test Results Text	0	0	0
54					
55					
56	ANNO_GRID	Grid Lines, Grid Text	0	varies	varies
57	ANNO_AXIS	Axis Lines & Text	0	varies	varies
58	ANNO_MISC	Misc. Profile Text	0	0	0
59					
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

* Indicates that level uses multiple colors, styles, weights, or custom line styles.

Source Plat (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1					
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59					
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

Source Reclamation Plan (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1					
2					
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58					
59					
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

Special Map (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1					
2					
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57					
58					
59					
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

State Maintenance (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1					
2					
3					
4					
5					
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57					
58					
59					
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

Structures (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1	STRC_OBJLINE	Solid Object	0*	3*	0
2	STRC_HDNLINE	Hidden Concrete	0	1	5
3	STRC_REBAR	Metal Reinforcement	6		
4					
5	STRC_DTLCTRLN	Object Centerlines	4	2	7
6	STRC_GRNDLN	Existing / New Ground Lines in Profile	8	2*	2*
7	STRC_PATTRN	Cross Hatching, Cross Section Patterns	10*	0	0
8	STRC_ACTVPTS	Active Points	14	5	5
9	STRC_PHTLINE	Alternate Position Lines	11	1	6
10					
11					
12					
13					
14	STRC_RWYCTRLN	Roadway Centerlines	8	1	7
15					
16					
17					
18					
19					
20	STRC_IDXCONTR	Contour Lines - Major	26	2	0
21	STRC_INTCONTR	Contour Lines - Minor	30	0	0
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50	ANNO_SHEET	Basic Sheets	varies	varies	varies
51					
52	ANNO_SMLPRINT	11" x 17" Small Print Sheet	varies	varies	varies
53	ANNO_EGRSTMP	Engineers Stamp	0	varies	0
54	ANNO_GENNOTE	General Design Notes, Dimension Lettering, Lines	0*	0*	0
55					
56					
57					
58					
59					
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

* Indicates that level uses multiple colors, styles, weights, or custom line styles.

Topography (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1					
2	SURV_GPS	GPS Control Points	0	0	0
3	SURV_PHOTGRM	Premark, Photo Center, Grid Ticks	0	0	0
4					
5					
6					
7					
8					
9					
10	RDWY_CURB	Curb & Gutter	0*	0	0, C*
11	RDWY_EDGERD	Edge of Oil, Shoulder of Road	0	0	C*
12	RDWY_BARRIER	Guardrail Concrete/Metal Existing	0	0	C*
13	RDWY_HORPNTS	PI's, PC's, PT's, Angle and Event Points	0	0	0
14	RDWY_HORALIGN	Surveyed Center Line	0	1	C*
15	RDWY_APPRCH	Paved Rural Approaches	0	0	C*
16	RDWY_SDWLK	Sidewalks, Back of Sidewalk, Misc. Flat Concrete	0	0	C*
17	RDWY_PAINT	Lane Lines, Special Pavement Markings	0	0	C*
18	RDWY_SIGNS	Sign 1 , 2 Post, Mail Box, Dilineator, Highway Shield	0*	0*	0
19					
20	SURF_IDXCONT	Index Contours	3	2	0, C*
21	SURF_INTCONT	Intermediate Contours	4	0	0, C*
22	SURF_BRKLN	DTM Breakline, Fill Slope, Cut Slope, Toe of Slope	0	1	C*
23	SURF_SPOTELEV	Spot Elevations	5	0	0
24	SURF_FENCE	Fences, Gates, Snow Fence, Cattle Guard	0	0	0, C*
25	SURF_TRAIL	Paths, Trails	0	0	C*
26	SURF_DITCH	Top of Ditch	1*	0	0, C*
27	SURF_MISCFTR	Material Source, Stockpile Site	0	1	0
28	SURF_VEG	Tree, Bush, Tree/Bush Boundary, Stump, etc.	2	0	0, C*
29	SURF_WATRFTR	River, Channels, Canals, Creeks, etc.	1*	0*	0, C*
30	STRC_HYDRO	Storm Sewer Manholes, Lines, Catch Basins, Inlets	120*	0*	0, C*
31	STRC_ROAD	Bridges, Abutments, Piers, Overpass, Underpass	0	3	0
32	STRC_RETWALL	Retaining Walls	0	2	C
33	STRC_NOISEWALL	Noise Walls	0	2	C
34	STRC_BLDNG	Building Footprint, Foundations	0	0	0*
35	STRC_MISC	Pads, Flagpoles, Bollards, Tanks	0	1	0
36	STRC_RAIL	Railroad Tracks, Switches, Protective Devices	3	0*	0, C*
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50	ANNO_SURV	Misc. Survey Notes	0	0	0
51	ANNO_ALIGN	Curve Data, Bearings, Stationing, Point Text	0	1	0
52	ANNO_RDWY	Misc. Roadway Notes, Street Names	0	0	0
53	ANNO_SURF	Misc. Surface Text	0	0	0
54	ANNO_STRC	Misc. Structure Notes	0	0	0
55	ANNO_RAIL	Misc. Railroad Notes	3	0	0
56	ANNO_GRID	Grid Notes	0	0	0
57	ANNO_PHOTOGRM	Photogrammetry Notes	0	0	0
58					
59					
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

* Indicates that level uses multiple colors, styles, weights, or custom line styles.

Total Ownership Map (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1					
2					
3					
4					
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10					
11					
12					
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36					
37					
38					
39					
40	PARCEL_SHADING	Parcel Shapes and Shading	varies	varies	varies
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
51					
52					
53					
54	ANNO_PARCEL	Parcel Information and Text	0	1	0
55					
56					
57					
58					
59					
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

Typicals (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1					
2					
3					
4					
5					
6					
7					
8					
9					
10	RDWY_CURB	Curb & Gutter	3	0	C*
11	RDWY_EDGERD	Edge of Paved / Unpaved Road, Edge of Oil	0	1	C*
12	RDWY_BARRIER	Concrete / Metal Guardrail, Attenuators, Median Barriers	0	2	C*
13					
14	RDWY_SURVCNTLN	Surveyed, Designed Center Lines	0	3	0
15					
16					
17					
18					
19					
20	SURF_GROUND	Natural Ground Lines	0	1	2
21	SURF_SUBGRD	Subgrade, Sub-Subgrade Lines	119*	1	1*
22	SURF_BASELN	Top of Base Lines, 3/4 Base Lines	7*	1	5*
23	SURF_FINGRD	Finish Grade Lines, Cut Slope, Fill Slope	0*	1*	0, C*
24					
25	SURF_TRAIL	Misc. Paths & Trails	174	1	2
26	SURF_DITCH	Top of Ditch, Flow Line of Ditch, Back Slope of Ditch	120	0	C*
27					
28					
29					
30	STRUC_EXIST	Existing Storm Sewer Lines	0*	0*	0, C*
31	STRUC_PROP	Proposed Storm Sewer Lines	0*	1*	0, C*
32	STRUC_RETWALL	Retaining Walls	0	2	C
33	STRUC_NOISEWALL	Noise Walls	0	2	C
34					
35	STRUC_MISC	Misc. Structures	0	2	0
36	STRUC_RAIL	Misc. Railroad Structures	0	2	0
37					
38					
39					
40	UTIL_TELE	Telephone Cable, Pole, Jbox, Trans. Tower	184	1*	0, C*
41	UTIL_FIBOPTIC	Fiber Optic Cable, Jbox, Trans. Tower	184	1*	0, C*
42	UTIL_ELEC	Electrical Cable, Pole, Jbox, Meter, Trans. Tower	3	1*	0, C*
43	UTIL_PIPEBELL	Pipe with Directional Bell	120	2	C
44	UTIL_PIPE	Pipe	188	2	C
45	UTIL_GAS	Gas Pipe, Valve, Riser	188	2	0, C*
46	UTIL_PETRO	Oil Pipe, Valve, Riser	188	2	0, C*
47	UTIL_WATER	Water Pipe, Hydrant, Meter, Valve, Riser, Well	120	2	0, C*
48	UTIL_SEWER	Sanitary Sewer Pipe, Manhole	121	2	0, C*
49	UTIL_IRRIG	Irrigation Pipe, Siphon, Manhole, Headwalls Pumps, etc.	120	2	0, C*
50					
51	ANNO_ALIGN	Alignment Text	0	1	0
52	ANNO_UTIL	Utility Text	varies	0	0
53	ANNO_SURF	Natural Ground Lines & Spot Elevation Text	0	0	0
54	ANNO_STRC	Structure Text	0	0	0
55	ANNO_RAIL	Railroad Text	3	0	0
56	ANNO_GRID	Grid Lines, Grid Text	0	varies	varies
57	ANNO_AXIS	Axis Lines, Axis Text	0	varies	varies
58	ANNO_MISC	Misc. X-Section Text	0	0	0
59	ANNO_DIMEN	Dimensions	0	0	0
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

* Indicates that level uses multiple colors, styles, weights, or custom line styles.

Utilities (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1					
2					
3					
4					
5					
6					
7					
8					
9					
10	RDWY_CURB	Curb & Gutter	3	0	C*
11	RDWY_EDGERD	Edge of Paved / Unpaved Road, Edge of Oil	0	1	C*
12	RDWY_BARRIER	Concrete / Metal Guardrail, Attenuators, Median Barriers	0	2	C*
13					
14	RDWY_SURVCNTLN	Surveyed, Designed Center Lines	0	3	0
15					
16					
17					
18					
19					
20	SURF_GROUND	Natural Ground Lines	0	1	2
21	SURF_SUBGRD	Subgrade, Sub-Subgrade Lines	119*	1	1*
22	SURF_BASELN	Top of Base Lines, 3/4 Base Lines	7*	1	5*
23	SURF_FINGRD	Finish Grade Lines, Cut Slope, Fill Slope	0*	1*	0, C*
24					
25	SURF_TRAIL	Misc. Paths & Trails	174	1	2
26	SURF_DITCH	Top of Ditch, Flow Line of Ditch, Back Slope of Ditch	120	0	C*
27					
28					
29					
30	STRUC_EXIST	Existing Storm Sewer Lines	0*	0*	0, C*
31	STRUC_PROP	Proposed Storm Sewer Lines	0*	1*	0, C*
32	STRUC_RETWALL	Retaining Walls	0	2	C
33	STRUC_NOISEWALL	Noise Walls	0	2	C
34					
35	STRUC_MISC	Misc. Structures	0	2	0
36	STRUC_RAIL	Misc. Railroad Structures	0	2	0
37					
38					
39					
40	UTIL_TELE	Telephone Cable, Pole, Jbox, Trans. Tower	184	1*	0, C*
41	UTIL_FIBOPTIC	Fiber Optic Cable, Jbox, Trans. Tower	184	1*	0, C*
42	UTIL_ELEC	Electrical Cable, Pole, Jbox, Meter, Trans. Tower	3	1*	0, C*
43	UTIL_PIPEBELL	Pipe with Directional Bell	120	2	C
44	UTIL_PIPE	Pipe	188	2	C
45	UTIL_GAS	Gas Pipe, Valve, Riser	188	2	0, C*
46	UTIL_PETRO	Oil Pipe, Valve, Riser	188	2	0, C*
47	UTIL_WATER	Water Pipe, Hydrant, Meter, Valve, Riser, Well	120	2	0, C*
48	UTIL_SEWER	Sanitary Sewer Pipe, Manhole	121	2	0, C*
49	UTIL_IRRIG	Irrigation Pipe, Siphon, Manhole, Headwalls Pumps, etc.	120	2	0, C*
50					
51	ANNO_ALIGN	Alignment Text	0	1	0
52	ANNO_UTIL	Utility Text	varies	0	0
53	ANNO_SURF	Natural Ground Lines & Spot Elevation Text	0	0	0
54	ANNO_STRC	Structure Text	0	0	0
55	ANNO_RAIL	Railroad Text	3	0	0
56	ANNO_GRID	Grid Lines, Grid Text	0	varies	varies
57	ANNO_AXIS	Axis Lines, Axis Text	0	varies	varies
58	ANNO_MISC	Misc. X-Section Text	0	0	0
59	ANNO_DIMEN	Dimensions	0	0	0
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

* Indicates that level uses multiple colors, styles, weights, or custom line styles.

Vicinity Map (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1					
2					
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11					
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54					
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56					
57					
58					
59					
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

Workzone Traffic Control (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1	SIGN_POST	New 1, 2 Post, Remove and Reset 1, 2 Post	0	2	0
2					
3	SIGN_EXIST	Retain and Protect 1, 2 Post	0	0	0
4					
5					
6					
7					
8					
9	SIGN_PORT	Portable Changeable Message Signs	0	2	0
10	PVMRK_WHITE	Skip, Edge Line, Dash, Lane Line	0	1*	0, C*
11	PVMRK_YELLOW	Skip, No Passing, Double Yellow, Edge Line, Dash, Bar	0*	0*	0, C*
12	PVMRK_STOPBAR	Stop Bar	0	0	C
13	PVMRK_CROSSWK	Crosswalk	0	0	C
14	PVMRK_CROSSBAR	Crosswalk Cross Bar	0	0	C
15	PVMRK_RAILRD	Railroad Crossing	0	0	0
16	PVMRK_ARROWS	Lt. or Rt Turn Arrow, Other Arrows	0	0	0
17	PVMRK_TEXT	Pavement Marking Text (generally 8')	0	0	0
18					
19					
20	PVMRK_DELIN	Delineators	0	0	0
21	WKZN_BARRIER	Temporary Barriers	0	2	C*
22	WKZN_CUSHION	Crash Cushions	0	2	0
23					
24					
25					
26					
27					
28					
29	WKZN_FLAGGER	Flagger	0	2	0
30					
31					
32					
33	WKZN_CHNLDEV	Tubular Markers	0	2	C
34	WKZN_DRUM	Drums	0	2	C
35	WKZN_PANEL	Vertical Panels	6	2	0
36	WKZN_BARRICADE	Barricades	0	2	C
37	WKZN_EQUIP	Portable Lighting	0	2	0
38	WKZN_PILOTCAR	Pilot Car	0	2	0
39	WKZN_ATTNUATR	Truck Mounted Attenuators	0	2	0
40	WKZN_PORTSIGNL	Portable Traffic Signals	0	2	0
41	WKZN_FLSHLGHT	Flashing Warning Lights	0	2	0
42	WKZN_ORNGFLAG	Orange Flags	6	2	0
43					
44					
45					
46					
47	WKZN_WRKAREA	Cross-hatching	0	0	0
48	WKZN_DIRECIND	Direction of Traffic Arrow	0	2	0
49	WKZN_DIRECVEH	Direction of Work Vehicles	0	2	0
50	ANNO_SIGN	Misc. Signing Notes & Text	0	1	0
51	ANNO_MRKG	Misc. Pavement Marking Notes & Text	0	1	0
52	ANNO_DILEN	Misc. Delineator Related Notes & Text	0	1	0
53					
54					
55					
56					
57					
58					
59					
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

* Indicates that level uses multiple colors, styles, weights, or custom line styles.

X-Sections (Model)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1					
2					
3					
4					
5					
6					
7					
8					
9					
10	RDWY_CURB	Curb & Gutter	3	0	C*
11	RDWY_EDGERD	Edge of Paved, Unpaved Road, Edge of Oil	0	1	C*
12	RDWY_BARRIER	Concrete/Metal Guardrail, Attenuators, Median Barriers	0	2	C*
13					
14	RDWY_SURVCNTLN	Surveyed, Designed Center Lines, Station Tick Marks	0	3	0
15					
16					
17					
18					
19					
20	SURF_GROUND	Natural Ground Lines	0	1	2
21	SURF_SUBGRD	Subgrade, Sub-Subgrade Lines	118*	1	1
22	SURF_BASELN	Top of Base Lines, 3/4 Base Lines	7*	1	5*
23	SURF_FINGRD	Finish Grade Lines, Cut Slope, Fill Slope	0*	1	0, C*
24					
25	SURF_TRAIL	Misc. Paths & Trails	174	1	2
26	SURF_DITCH	Top of Ditch, Flow Line of Ditch, Back Slope of Ditch	120	0	0, C*
27					
28					
29					
30	STRUC_EXIST	Proposed Storm Sewer Lines, Manholes, Culverts, Headwalls, etc	0*	0*	0, C*
31	STRUC_PROP	Existing Storm Sewer Lines, Manholes, Culverts, Headwalls, etc.	0*	1*	0, C*
32	STRUC_RETWALL	Retaining Walls	0	2	C
33	STRUC_NOISEWALL	Noise Walls	0	2	C
34					
35	STRUC_MISC	Misc. Structures	0	2	0
36	STRUC_RAIL	Misc. Railroad Structures	0	2	0
37					
38					
39					
40	UTIL_TELE	Telephone Cable, Pole, Anchor, Jbox, Trans. Tower	184	1*	0, C*
41	UTIL_FIBOPTIC	Fiber Optic Cable, Jbox, Trans. Tower	184	1*	0, C*
42	UTIL_ELEC	Electrical Cable, Pole, Anchor, Jbox, Meter, Trans. Tower	3	1*	0, C*
43	UTIL_PIPEBELL	Pipe with Directional Bell	120	2	C
44	UTIL_PIPE	Pipe	188	2	C
45	UTIL_GAS	Gas Pipe, Valve, Riser	188	2	0, C*
46	UTIL_PETRO	Oil Pipe, Valve, Riser	188	2	0, C*
47	UTIL_WATER	Water Pipe, Hydrant, Meter, Valve, Riser, Well	120	2	0, C*
48	UTIL_SEWER	Sanitary Sewer Pipe, Manhole	121	2	0, C*
49	UTIL_IRRIG	Irrigation Pipe, Siphon, Manhole, Minor Structures, Headwalls, etc	120	2	0, C*
50					
51	ANNO_ALIGN	Alignment Text	0	1	0
52	ANNO_UTIL	Utility Text	varies	0	0
53	ANNO_SURF	Natural Ground Lines & Spot Elevation Text	0	0	0
54	ANNO_STRC	Structure Text	0	0	0
55	ANNO_RAIL	Railroad Text	3	0	0
56	ANNO_GRID	Grid Lines, Grid Text	0	varies	varies
57	ANNO_AXIS	Axis Lines, Axis Text	0	varies	varies
58	ANNO_MISC	Misc. X-Section Text	0	0	0
59	ANNO_DIMEN	Dimensions	0	0	0
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

* Indicates that level uses multiple colors, styles, weights, or custom line styles.

Detail Sheets (Sheet)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1	GRAPH_D1DISCLAIM	District 1 Disclaimer	0	0	0
2	GRAPH_D2DISCLAIM	District 2 Disclaimer	0	0	0
3	GRAPH_D3DISCLAIM	District 3 Disclaimer	0	0	0
4	GRAPH_D4DISCLAIM	District 4 Disclaimer	0	0	0
5	GRAPH_D5DISCLAIM	District 5 Disclaimer	0	0	0
6	GRAPH_D6DISCLAIM	District 6 Disclaimer	0	0	0
7	GRAPH_PRELIM	PRELIMINARY / NOT APPROVED FOR CONSTRUCTION	3	1	0
8	GRAPH_STAMP	Engineer's Stamp	0	varies	0
9	GRAPH_D9DISCLAIM	District 9 Disclaimer	0	0	0
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
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36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50	ANNO_TEXT	Sheet-Specific Text and Callouts	0	0	0
51	ANNO_NOTES	Sheet-Specific General Notes	0	0	0
52	ANNO_PATTRN	Sheet-Specific Patterns	0	varies	varies
53	ANNO_SYMBOL	Sheet-Specific Symbols (Cells)	0	varies	varies
54	ANNO_TITLE	Title Block Text	0	varies	varies
55	ANNO_SCALE	Bar Scale and Text	0	varies	varies
56	ANNO_GRID	Grid Lines, Grid Text	0	varies	varies
57	ANNO_LNWORK	Sheet Line Work	0	varies	varies
58	ANNO_BORDER	Title Block and Border	0	varies	varies
59	ANNO_DIMEN	Sheet-Specific Dimensions	0	varies	varies
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

Diagrams and Schematics (Sheet)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1	GRAPH_D1DISCLAIM	District 1 Disclaimer	0	0	0
2	GRAPH_D2DISCLAIM	District 2 Disclaimer	0	0	0
3	GRAPH_D3DISCLAIM	District 3 Disclaimer	0	0	0
4	GRAPH_D4DISCLAIM	District 4 Disclaimer	0	0	0
5	GRAPH_D5DISCLAIM	District 5 Disclaimer	0	0	0
6	GRAPH_D6DISCLAIM	District 6 Disclaimer	0	0	0
7	GRAPH_PRELIM	PRELIMINARY / NOT APPROVED FOR CONSTRUCTION	3	1	0
8	GRAPH_STAMP	Engineer's Stamp	0	varies	0
9	GRAPH_D9DISCLAIM	District 9 Disclaimer	0	0	0
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
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21					
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44					
45					
46					
47					
48					
49					
50	ANNO_TEXT	Sheet-Specific Text and Callouts	0	0	0
51	ANNO_NOTES	Sheet-Specific General Notes	0	0	0
52	ANNO_PATTRN	Sheet-Specific Patterns	0	varies	varies
53	ANNO_SYMBOL	Sheet-Specific Symbols (Cells)	0	varies	varies
54	ANNO_TITLE	Title Block Text	0	varies	varies
55					
56					
57	ANNO_LNWORK	Sheet Line Work	0	varies	varies
58	ANNO_BORDER	Title Block and Border	0	varies	varies
59	ANNO_DIMEN	Sheet-Specific Dimensions	0	varies	varies
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

Note Sheets (Sheet)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1	GRAPH_D1DISCLAIM	District 1 Disclaimer	0	0	0
2	GRAPH_D2DISCLAIM	District 2 Disclaimer	0	0	0
3	GRAPH_D3DISCLAIM	District 3 Disclaimer	0	0	0
4	GRAPH_D4DISCLAIM	District 4 Disclaimer	0	0	0
5	GRAPH_D5DISCLAIM	District 5 Disclaimer	0	0	0
6	GRAPH_D6DISCLAIM	District 6 Disclaimer	0	0	0
7	GRAPH_PRELIM	PRELIMINARY / NOT APPROVED FOR CONSTRUCTION	3	1	0
8	GRAPH_STAMP	Engineer's Stamp	0	varies	0
9	GRAPH_D9DISCLAIM	District 9 Disclaimer	0	0	0
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
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45					
46					
47					
48					
49					
50	ANNO_TEXT	Sheet-Specific Text and Callouts	0	0	0
51	ANNO_NOTES	Sheet-Specific General Notes	0	0	0
52	ANNO_PATTRN	Sheet-Specific Patterns	0	varies	varies
53	ANNO_SYMBOL	Sheet-Specific Symbols (Cells)	0	varies	varies
54	ANNO_TITLE	Title Block Text	0	varies	varies
55					
56					
57	ANNO_LNWORK	Sheet Line Work	0	varies	varies
58	ANNO_BORDER	Title Block and Border	0	varies	varies
59	ANNO_DIMEN	Sheet-Specific Dimensions	0	varies	varies
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

Plan, Profile, Plan & Profile Sheets (Sheet)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1	GRAPH_D1DISCLAIM	District 1 Disclaimer	0	0	0
2	GRAPH_D2DISCLAIM	District 2 Disclaimer	0	0	0
3	GRAPH_D3DISCLAIM	District 3 Disclaimer	0	0	0
4	GRAPH_D4DISCLAIM	District 4 Disclaimer	0	0	0
5	GRAPH_D5DISCLAIM	District 5 Disclaimer	0	0	0
6	GRAPH_D6DISCLAIM	District 6 Disclaimer	0	0	0
7	GRAPH_PRELIM	PRELIMINARY / NOT APPROVED FOR CONSTRUCTION	3	1	0
8	GRAPH_STAMP	Engineer's Stamp	0	varies	0
9	GRAPH_D9DISCLAIM	District 9 Disclaimer	0	0	0
10					
11					
12					
13					
14					
15					
16					
17					
18					
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48					
49					
50	ANNO_TEXT	Sheet-Specific Text and Callouts	0	0	0
51	ANNO_NOTES	Sheet-Specific General Notes	0	0	0
52	ANNO_PATTRN	Sheet-Specific Patterns	0	varies	varies
53	ANNO_SYMBOL	Sheet-Specific Symbols (Cells)	0	varies	varies
54	ANNO_TITLE	Title Block Text	0	varies	varies
55	ANNO_PROFGRID	Profile Grid	0	varies	varies
56	ANNO_PROFTEXT	Profile Text	0	1	0
57	ANNO_LNWORK	Sheet Line Work	0	varies	varies
58	ANNO_BORDER	Title Block and Border	0	varies	varies
59	ANNO_DIMEN	Sheet-Specific Dimensions	0	varies	varies
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies

Summary Sheets (Sheet)

LEV #	LEVEL NAME	DESCRIPTION	COLOR	WEIGHT	LINE STYLE
1	GRAPH_D1DISCLAIM	District 1 Disclaimer	0	0	0
2	GRAPH_D2DISCLAIM	District 2 Disclaimer	0	0	0
3	GRAPH_D3DISCLAIM	District 3 Disclaimer	0	0	0
4	GRAPH_D4DISCLAIM	District 4 Disclaimer	0	0	0
5	GRAPH_D5DISCLAIM	District 5 Disclaimer	0	0	0
6	GRAPH_D6DISCLAIM	District 6 Disclaimer	0	0	0
7	GRAPH_PRELIM	PRELIMINARY / NOT APPROVED FOR CONSTRUCTION	3	1	0
8	GRAPH_STAMP	Engineer's Stamp	0	varies	0
9	GRAPH_D9DISCLAIM	District 9 Disclaimer	0	0	0
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
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43					
44					
45					
46					
47					
48					
49					
50	ANNO_TEXT	Sheet-Specific Text and Callouts	0	0	0
51	ANNO_NOTES	Sheet-Specific General Notes	0	0	0
52	ANNO_PATTRN	Sheet-Specific Patterns	0	varies	varies
53	ANNO_SYMBOL	Sheet-Specific Symbols (Cells)	0	varies	varies
54	ANNO_TITLE	Title Block Text	0	varies	varies
55	ANN0_TABLE	Summary Tables	0	varies	varies
56					
57					
58	ANNO_BORDER	Title Block and Border	0	varies	varies
59	ANNO_DIMEN	Sheet-Specific Dimensions	0	varies	varies
60	RSVD_1	Reserved 1 (non-print)	varies	varies	varies
61	RSVD_2	Reserved 2 (non-print)	varies	varies	varies
62	RSVD_NOTES	Notes (non-print)	varies	varies	varies
63	RSVD_3	Reserved 3 (non-print)	varies	varies	varies